

May 24, 1963

ELECTRONIC DESIGN



ELEVENTH ANNUAL TRANSISTOR DATA CHART

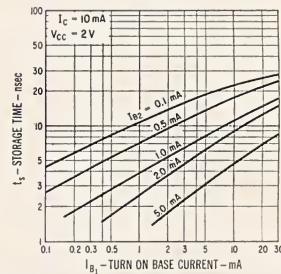
FASTEST TRANSISTORS FOR ALL COMPUTER REQUIREMENTS

FASTEST LOW LEVEL LOGIC

2N709
(NPN)

- SWITCHING TIME τ_s — 6 nsec max @ 5/5/5mA
- V_{sat} — 0.3V max @ $I_C = 3mA$ $I_B = .15mA$
- h_{FE} — 20 min @ $I_C = 10mA$ $V_{CE} = 0.5V$
- f_T — 600 MC min @ $I_C = 5mA$ $V_{CE} = 4V$

Package: TO-18

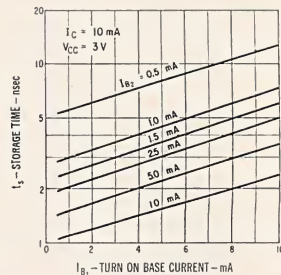


FASTEST LOGIC

2N2369
(NPN)

- SWITCHING TIME τ_s — 13 nsec max @ 10/10/10mA
- V_{sat} — 0.25V max @ $I_C = 10mA$ $I_B = 1mA$
- h_{FE} — 20 min @ $I = 100mA$ $V_{CE} = 2V$
- f_T — 500 MC min @ $I_C = 10mA$ $V_{CE} = 10V$

Package: TO-18

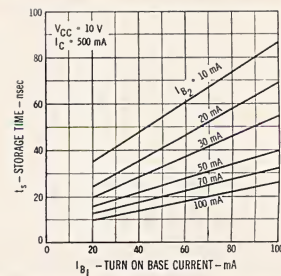


FASTEST CORE DRIVER

2N2845 SERIES
(NPN)

- SWITCHING TIME τ_s — 20 nsec @ 50/50/50mA
- V_{sat} — 1.0V max @ $I_C = 500mA$ $I_B = 50mA$
- h_{FE} — 20 min @ $I_C = 500mA$ $V_{CE} = 10V$
- f_T — 250 MC @ $I_C = 50mA$ $V_{CE} = 10V$

Package: TO-18, TO-5

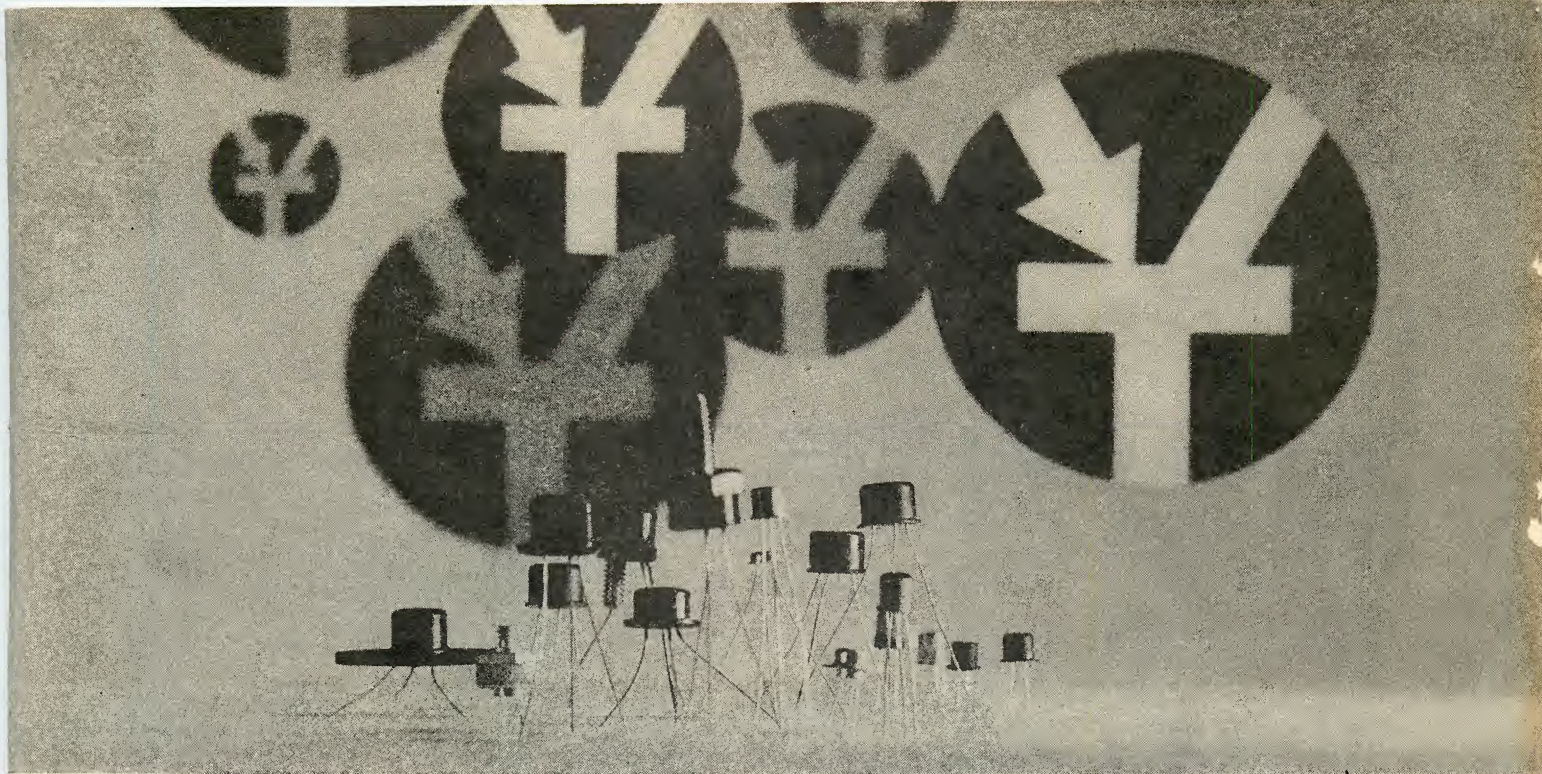


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ELECTRONIC DESIGN'S ELEVENTH ANNUAL TRANSISTOR DATA CHART 1963

Donald Christiansen
Technical Editor

ELECTRONIC DESIGN's 11th Annual Transistor Data Chart includes more than 3,000 listings, of which about 375 appear for the first time.

Transistors are classified according to seven application categories: Audio and General Purpose (page T4), High-Frequency (page T16), Power (page T40), Low-Level Switching (page T62), High-Level Switching (page T77) and, for the first time, Field-Effect (page T85) and Unijunction (page T86).

Within each category, types are arranged in order of increasing value of a key design parameter. This also permits quick identification of close substitutes.

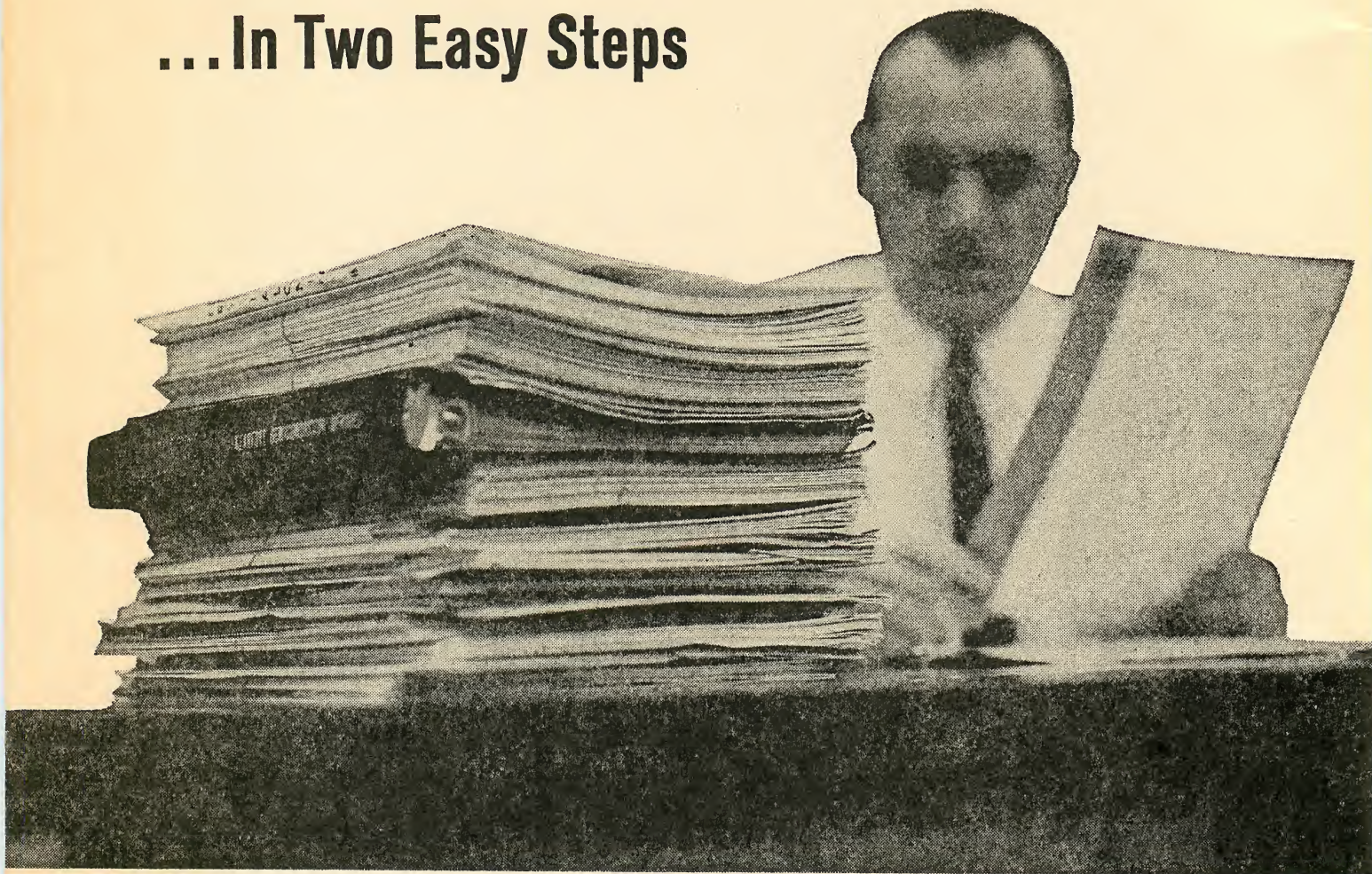
Alternate suppliers are listed in the "Remarks" column. The manufacturer whose data are listed is identified in the "Mfr." column. He is not necessarily the original registrant.

A cross index (page T88) identifies types in numerical sequence. Each type in the cross index carries a code that identifies its application category and specifies the block of 10 types in which it appears. A3, for example, means the type can be found in the third block of the Audio section.

Many manufacturers, upon request, provide detailed application notes and data sheets to the design engineer. Where this is true, it is noted next to the manufacturer's name in the list of manufacturers (page T1).

Update Your Transistor File

...In Two Easy Steps



Step 1. Send for your personal copy of the 1963 Transistor Data Chart, Reader-Service No. 549. It has been tailored to meet your needs as a design engineer—to guide you in the rapid selection of transistors for a particular circuit need.

Step 2. Having narrowed the field to a number of similar types, your next step is to refer to manufacturers' specification sheets for exact test conditions, application details and other pertinent information.

But unless you have invested much time and effort on your transistor file, it is bound to contain obsolete types and overlook new ones.

So, to supplement the Data Chart, **ELECTRONIC DESIGN** has made special arrangements with semiconductor manufacturers to provide specification sheets and application notes to readers requesting this material. Merely circle the number alongside each manufacturer's name on the special Reader-Service card at the end of this section.

Transistor Manufacturers

Code	Company	Further Information Available	
		Type	Circle Reader-Service No.
AI	Amelco, Inc. 341 Moffett Blvd. Mountain View, Calif.	FET application notes, 20-page data folder, and other brochures	400
AMF	American Machine and Foundry Co. Leland Airborne Products Div. AMF Semiconductor Dept. Vandalia, Ohio	Data sheets on 38 transistor types	401
AMP	Amperex Electronic Corp. 230 Duffy Ave. Hicksville, L.I., N.Y.	Several condensed catalogs and application notes	402
BE	Bendix Semiconductor Div. South St. Holmdel, N.J.	Two guides to silicon and germanium transistors	403
CS	Clark Semiconductor Corp. Div. of National Semiconductor Walnut Ave. Clark, N.J.	Data sheets on transistors	404
CL	Clevite Transistor 200 Smith St. Waltham 54, Mass.	Condensed catalog and application notes	405
CT	Crystalonics, Inc. 249 Fifth St. Cambridge 42, Mass.	3-ring folder of data sheets and application notes	406
DE	Delco Radio Div. GM Corp. Kokomo, Ind.	Condensed catalog, data sheets, application notes and test data	407
FA	Fairchild Semiconductor 545 Whisman Road Mountain View, Calif.	Condensed catalog and data sheets	408
GE	General Electric Co. Semiconductor Products Dept. Electronics Park Syracuse 1, N.Y.	Condensed catalog, data sheets and application notes	409
GI	General Instrument Corp. 18 East 41st Street New York 17, N.Y.	Data sheets, tentative specifications and application notes	410
HW	Honeywell Semiconductor Products 2747 Fourth Ave. South Minneapolis 8, Minn.	Application notes, lab reports and data	411
HU	Hughes Semiconductor Div. 500 Superior Ave. Newport Beach, Calif.	Application selection guide, data sheets and brochures	412
IND	Industro Transistor Corp. 35-10 36th Ave. Long Island City 6, N.Y.	Condensed catalog, data sheets and application notes	413
KF	Kearfott Semiconductor Corp. 437 Cherry St. West Newton 65, Mass.	Loose leaf binder of semiconductor engineering data	414
MO	Motorola Semiconductor Products, Inc. 5005 E. McDowell Road Phoenix 8, Ariz.	Condensed catalog, data sheets and reliability brochure	415
NA	National Semiconductor Corp. 90 Rose Hill Ave. Danbury, Conn.	Condensed catalog, data sheets, engineering memos, application notes	416

Code	Company	Further Information Available	
		Type	Circle Reader-Service No.
PSI	Pacific Semiconductor, Inc. (TRW Electronics) 12955 Chadron Ave. Hawthorne, Calif.	Condensed catalog and data sheets	417
PH	Philco Corp. Lansdale Div. 504 Church Road Lansdale, Pa.	Transistor reference chart and planar reliability report	418
RCA	Radio Corp. of America Semiconductor Div. Somerville, N.J.	Condensed catalog, data sheets and application notes on many devices	419
RRD	Radio Development & Research Corp. 100 Pennsylvania Ave. Paterson 3, N.J.	Will not manufacture after 1963	
RA	Raytheon Co. Semiconductor Div. 350 Ellis St. Mountain View, Calif.	Condensed catalog	421
STC	Silicon Transistor Corp. 150 Glen Cove Road Carle Place, L.I., N.Y.	Condensed catalog	422
SI	Siliconix, Inc. Sunnyvale, Calif.	Application notes, data sheets and articles on FET devices	423
SSE	Solid State Electronics Corp. 15321 Rayen St. Sepulveda, Calif.	Data sheet on SST610 transistor	424
SSP	Solid State Products, Inc. One Pingree St. Salem, Mass.	Folder of data sheets and comparison chart	425
SSD	Sperry Semiconductor Div. Norwalk, Conn.	Data sheets and tentative specifications	426
SPR	Sprague Electric Co. 347 Marshall St. North Adams, Mass.	Condensed catalog	427
SY	Sylvania Semiconductor Div. 100 Sylvan Road Woburn, Mass.	Full catalog, data sheets and Circuit Loops brochures	428
TI	Texas Instruments Inc. 13500 North Central Expressway Dallas 22, Texas	Data sheets, application notes and theory of FET devices brochure	429
TR	Transitron Electronic Corp. 168-182 Albion St. Wakefield, Mass.	Data sheets, application notes, condensed catalog and an article reprint	430
TS	Tung-Sol Electric, Inc. One Summer Ave. Newark 4, N.J.	Condensed catalog, FET brochure and silicon double diffused brochure	431
WE	Western Electric Co., Inc. Marion and Vine St. Laureldale, Pa.	Available only to agencies of the U.S. Govt. and their subcontractors	
WH	Westinghouse Electric Corp. 3 Gateway Center Pittsburgh 30, Pa.	Condensed catalog, data sheets, application and design notes	433

HOW TO USE THE CHARTS

A color code pairs the transistor type with the value of its *key parameter*. Types are listed in order of increasing value of key parameter. Note, however, that since various manufacturers may characterize their types differently, some "jumps" may take place in the sequence. Consider, for example, a type in the high-frequency category. Its key characteristic will be f_{ae} , f_T , or f_{ab} (values of f_T are preceded by a single asterisk; values of f_{ab} , by a double asterisk). But f_{ae} is the frequency at which h_{fe} drops to 0.707 of its low frequency value, and f_T is the gain-bandwidth product, or the product of h_{fe} and frequency at a point where h_{fe} is dropping by 6 db per octave. Thus, f_T is about h_{fe} times greater than f_{ae} for a given transistor.

Under *maximum ratings*, manufacturers were asked to specify collector power dissipation at 25 C case temperature, this generally being the most meaningful single dissipation rating. The derating factor can then be used to estimate P_c for other operating temperatures.

Either V_{CEO} or V_{CBO} is listed as a maximum voltage rating. V_{CEO} is related to collector-emitter diode breakdown and V_{CBO} to collector-base diode breakdown. But bear in mind that many manufacturers' data sheets will list other important voltage ratings, such as V_{CES} or V_{CER} .

Under *characteristics*, ELECTRONIC DESIGN asked manufacturers to supply typical values rather than maxs or mins. Where deviations from this occur they are noted.

Finally, it must be cautioned that the characteristics listed are primarily a guide and generally cannot be used for direct comparison of types. This is because it is impossible to list the wide variety of test conditions under which characteristics have been measured. V_{CEO} , for example, can differ considerably for comparable devices when measured at a collector current of 100 μ a in one case and 1 ma in another. The best bet is to consult the manufacturers' data sheets before making the final selection.

Key to Symbols

f_{ae}	=	small-signal short-circuit forward current transfer ratio cutoff frequency (common-emitter)
f_{ab}	=	small-signal short-circuit forward current transfer ratio cutoff frequency (common-base)
f_T	=	gain-bandwidth product
P_c	=	collector power dissipation (average)
T_j	=	junction temperature deg C
mw/°C	=	derating factor
V_{CEO}	=	max collector voltage, collector to emitter, base open
V_{CBO}	=	max collector voltage, collector to base, emitter open
I_c	=	max collector current
I_p	=	max collector current (peak)
h_{fe}	=	small-signal short-circuit forward current transfer ratio (common-emitter)
h_{FE}	=	dc short-circuit forward current transfer ratio (common-emitter)
I_{CO}	=	collector cutoff current (dc) emitter open
C_{oe}	=	output capacitance (common-emitter)
C_{ob}	=	output capacitance (common-base)
t_r	=	rise time
t_s	=	storage time
$V_{CE(sat)}$	=	collector-to-emitter saturation voltage
g_m	=	transconductance
V_P	=	pinch-off voltage
I_{DSS}	=	zero-bias drain current
BV_{DGO}	=	drain-gate breakdown voltage with gate-source open-circuited
BV_{DGS}	=	breakdown voltage from drain to gate with drain shorted to source
C_{is}	=	common source short-circuit input capacitance
N.F.	=	noise figure
η	=	intrinsic standoff ratio
I_{EO}	=	max emitter reverse current
I_P	=	max peak point emitter current
$V_{E(sat)}$	=	max emitter saturation voltage
V_{EB2}	=	min emitter reverse voltage
V_{OB1}	=	min base one peak pulse voltage

Key to Transistor Types

Construction			
AJ	Alloy junction	GD	Grown diffused
AD	Alloy diffused	GJ	Grown junction
DD	Double diffused	GR	Rate grown
DG	Grown diffused	MB	Meltback
DJ	Diffused junction	MD	Micro-alloy diffused base
DM	Diffused mesa	MS	Mesa
DDM	Double-diffused mesa	PE	Planar epitaxial
DP	Diffused planar	PL	Planar
DR	Drift	SBT	Surface barrier
ED	Electro-chemical diffused-collector	SP	Surface precision alloy
EM	Epitaxial mesa	TDP	Triple-diffused planar
EP	Epitaxial	Materials	
FA	Fused alloy	ge	germanium
FJ	Fused junction	si	silicon

Manufacturers and their Lines

Manufacturer	Audio (A)	High-Frequency (HF)	Power (P)	Low-Level Switching (LL)	High-Level Switching (HL)	Field-Effect (FE)	Uni-junction (UNJ)
Amelco		•		•		•	
AMF			•				
Amperex	•	•	•	•	•		
Bendix	•		•	•	•		
Clark			•				
Clevite		•	•	•	•		
Crystalonics				•		•	
Delco			•		•		
Fairchild		•	•	•	•		
General Electric	•	•	•	•	•	•	•
General Instrument	•	•	•	•	•		
Honeywell		•	•				
Hughes	•	•		•	•		
Industro	•	•	•	•	•		
Kearfott	•	•	•	•	•		
Motorola	•	•	•	•	•	•	
National Semiconductor	•	•	•	•			
Philco	•	•		•	•		
PSI		•	•		•		
Radio Development	•						
Raytheon	•	•	•	•	•		
RCA	•	•	•	•	•	•	
Silicon Transistor			•		•		
Siliconix						•	
Solid State Electronics	•			•			
Solid State Products					•		
Sperry	•	•		•			
Sprague	•	•		•			
Sylvania	•	•	•	•			
Texas Instruments	•	•	•	•	•		•
Transitron	•	•	•	•	•		
Tung-Sol	•	•	•	•	•	•	
Western Electric	•	•	•	•	•		
Westinghouse			•		•		

AUDIO AND GENERAL PURPOSE

Mostly audio and general-purpose types below one watt. In order of increasing forward-current transfer ratio.

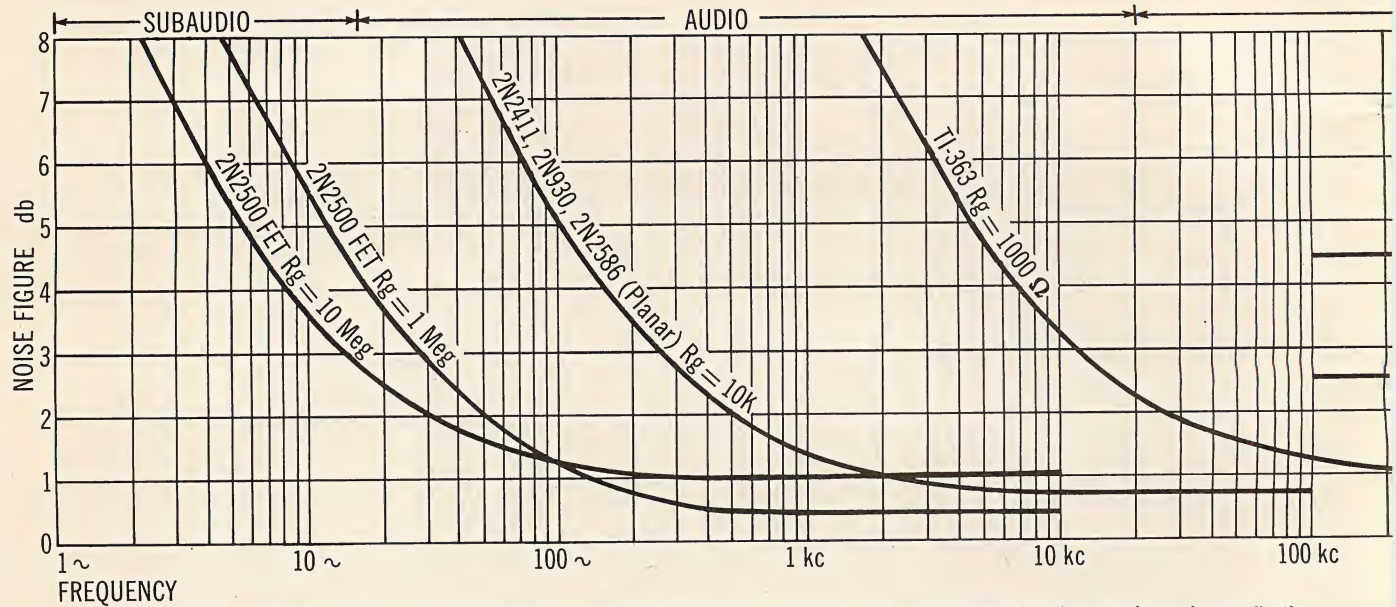
Cross Index Key	Type No.	Mfr.	Type	h_{fe} * h_{FE} ** G_m	MAX. RATINGS				CHARACTERISTICS						Remarks
					P_c (mw)	T_i (°C)	$mW/°C$	V_{CEO} * V_{CBO} (v)	I_C (ma)	I_{CO} (μ a)	NF (db)	C_{oe} * C_{ob} (pf)	f_{ae} * f_T ** f_{ab} (mc)		
A 1	2N160	RRD	npn, GJ, si	0.93	150	175	—	*40	25	0.2	25	7	4		
	2N160A	RRD	npn, GJ, si	0.93	150	175	—	*40	25	0.2	25	7	4		
	2N349	RRD	npn, GJ, si	0.95	750	175	—	*125	40	10	—	—	3		
	2N161	RRD	npn, GJ, si	0.96	150	175	—	*40	25	0.2	25	7	5		
	2N161A	RRD	npn, GJ, si	0.96	150	175	—	*40	25	0.2	25	7	5		
A 2	2N348	RRD	npn, GJ, si	0.96	750	175	—	*90	50	10	—	—	3	TR, NA	
	2N1096	RRD	npn, GJ, si	0.96	500	175	—	*90	30	6	—	—	3		
	2N347	RRD	npn, GJ, si	0.98	750	175	—	*60	60	10	18	7	3		
	2N1095	RRD	npn, GJ, si	0.98	500	175	—	*60	40	5	—	—	3		
	2N163	RRD	npn, GJ, si	0.99	150	175	—	*40	25	0.2	25	7	6		
	2N163A	RRD	npn, GJ, si	0.99	150	175	—	*40	25	0.2	25	7	6		
	2N1566	TI	npn, MS, si	1.2	—	175	80	60	100	1	50	—	—		
	2N2673	GE	npn, GD, si	*8-22	250	185	1.66	*60	25	0.004	11	4	10		
	2N1154	NA	npn, DM, si	9	750	150	5	50	60	5	—	—	—		
	2N1155	NA	npn, DM, si	9	750	150	5	80	50	6	—	—	—		
A 3	2N1156	NA	npn, DM, si	9	750	150	5	120	40	8	—	—	—	TI TR, USN GE, TR, RRD, NA, RA, AMP GE, TI GE, TI	
	2N117	TI	npn, GR, si	9-20	150	175	1	*30	25	2	20	—	4		
	2N332	TI	npn, GR, si	9-20	150	175	1	45	25	2	20	—	6		
	2N332A	NA	npn, MS, si	9-20	150	175	0.86	45	—	2	—	30	—		
	2N333A	NA	npn, MS, si	9-20	500	175	2.8	45	—	0.5	—	15	—		
	2N1149	TR	npn, DJ, si	9-20	150	150	—	*45	25	0.1	25	7	7		
	2N243	TI	npn, GJ, si	9-32	750	150	6	60	60	1	—	—	7		
	2N470	TR	npn, GJ, si	10-25	200	200	—	15	25	0.02	22	7	8		
	2N471	TR	npn, GJ, si	10-25	200	200	—	30	25	0.02	22	7	8		
	2N472	TR	npn, GJ, si	10-25	200	200	—	45	25	0.02	22	7	8		
A 4	2N472A	TR	npn, DG, si	10-25	200	200	—	45	25	0.02	22	7	8	NA, TI	
	2N102/13	SY	npn, AJ, ge	10.5	1w	75	20	*30	1.5a	5ma	—	—	—		
	2N144/13	SY	npn, AJ, ge	10.5	1w	75	20	*60	0.8a	5ma	—	—	—		
	2N1439	NA	npn, AJ, si	12	400	200	2.28	50	100	0.01	12	25	1		
	2N756	NA	npn, DM, si	12-20	500	200	2.5	45	—	9.2	—	—	—		
	2N756A	NA	npn, DM, si	12-20	500	200	2.5	60	—	0.1	—	—	—		
	2N2674	NA	npn, GD, si	*12-40	250	185	1.66	*60	25	0.004	11	4	11		
	CK64B	RA	npn, AJ, ge	13.5	75	85	1.25	45	100	10	—	—	—		
CK64C	RA	npn, AJ, ge	13.5	75	85	1.25	45	100	10	—	—	—			
2N935	SSD	npn, AJ, si	14	385	160	2.85	40	50	0.005	18	70	2	Sub min Sub min NA		
A 5	2N284	AMP	npn, AJ, ge	15	125	75	2.5	*32	125	4.5	—	—	—	NA TR audio/med. power	
	2N284A	AMP	npn, AJ, ge	15	125	75	2.5	*60	125	4.5	—	—	—		
	2N339A	TR	npn, DJ, si	15	1000	200	8	55	1	—	—	—	—		
	2N340A	TR	npn, DJ, si	15	1000	200	8	85	0.1	1	—	—	—		
	2N341A	TR	npn, DJ, si	15	1000	200	8	*125	0.1	1	—	—	—		
	2N927	NA	npn, AJ, si	15	150	200	2.5	70	—	.005	—	12	.8		
	2N938	SSD	npn, AJ, si	15	250	175	1.7	35	100	.001	—	7	1		
	2N1247	NA	npn, DM, si	15	30	150	0.2	6	5	1.5	—	12	—		
	2N1249	TR	N-GJ	15	30	—	—	6	5	0.002	—	8	5		
	2N1440	NA	npn, AJ, si	15	400	200	2.28	50	100	0.01	12	25	1		
A 6	2N1623	RA	npn, AJ, si	15	250	160	0.54	20	50	.005	18	70	.1	AMP	
	2N1655	RA	npn, AJ, si	15	250	160	0.54	*125	50	.005	18	70	.2		
	BC212	AMP	si	15	250	150	2	*60	50	0.01	8	50	1		
	TR34	IND	npn, AJ, ge	15	120	85	3	40	150	10	15	15	1.6		
	2N2391	TI	P, si	*15-45	1000	—	—	20	30	—	—	—	—		
	TS601	TS	npn, AJ, ge	*15-60	200	100	—	*12	400	20	—	—	—		
	TS603	TS	npn, AJ, ge	*15-60	200	100	—	*20	400	20	—	—	—		
	2N925	NA	npn, AJ, si	16	150	200	2.5	50	—	.005	—	12	.8		
	2N529	GI	*	17	100	85	2	*15	—	3	14	14	—		
	2N756A	TR	N-M	17	500	—	0.30	60	100	0.1	—	5	100		
A 7	2N1277	TR	N-GJ	*18	150	—	1.00	*40	25	—	—	5	15	TI TR GE, TR, NA, RA, AMP	
	2N1584	TR	N-GJ	18	150	—	1.00	60	25	—	—	5	5		
	2N1586	TR	npn, GJ, si	*18	150	150	1.33	15	50	0.5	20	*2	15		
	2N1587	TR	N-GJ	18	150	—	1.00	30	25	—	—	5	5		
	2N1588	TR	npn, GJ, si	*18	150	150	1.33	60	50	0.5	20	*2	15		
	2N334A	NA	npn, MS, si	18-36	500	175	2.8	45	—	0.5	15	—	—		
	2N757	NA	npn, MS, si	18-36	500	200	2.5	45	—	0.2	—	—	—		
	2N757A	NA	npn, MS, si	18-36	500	200	2.5	60	—	0.1	—	—	—		
	2N118	TI	npn, GR, si	18-40	150	175	1	*30	25	2	20	—	5		
	2N333	TI	npn, GR, si	18-40	150	175	1	45	25	2	20	—	8		

A continued

Cross Index Key	Type No.	Mfr.	Type	h_{fe} * h_{FE} * G_m	MAX. RATINGS				CHARACTERISTICS					Remarks
					P_c (mw)	T_j (°C)	$m_w/°C$	V_{CE0} * V_{CBO} (v)	I_C (ma)	I_{CO} (μ a)	NF (db)	C_{oe} * C_{ob} (pf)	f_{tze} * f_T * f_{ab} (mc)	
A 8	2N1150	NA	npn, DM, si	18-40	150	175	0.86	45	25	2	—	7	1	TI
	2N334	TI	npn, GR, si	150	150	175	1	45	25	2	20	—	10	GE, TR, NA, RA, AMP
	2N758	NA	npn, MS, si	18-90	500	200	2.5	45	—	0.2	—	—	—	—
	2N759A	NA	npn, DM, si	18-90	500	200	2.5	60	—	0.1	—	—	—	—
	2N1151	NA	npn, DM, si	18-90	150	175	0.86	*45	25	2	—	7	8	TR, TI
	2N129	SPR	ppp, AJ, ge	20	30	85	—	*3	5	—	—	—	30	—
A 9	2N323	NA	ppp, AJ, si	20	150	200	2.5	40	—	.005	—	12	.8	US, MIL only
	2N1051	WE	npn, DD, si	20	600	150	0.25	60	—	0.1	—	8	70	NA
	2N1248	TR	N-GJ	20	30	—	—	6	5	0.002	—	8	5	HI-volt switch
	2N1670	GI	ppp, DR, ge	20	120	85	2	*100	—	3	—	3	—	—
	2N2551	HU	ppp, A, si	*20	400	160	3.0	.150	200	0.1	6	90	1.0	—
	BC210	AMP	si	20	250	150	2	*25	50	0.001	8	50	1	—
A 10	ST1506	TR	N-M	*20	300	—	0.50	30	—	—	—	8	5	—
	ST1543	TR	N-M	20	30	—	—	6	5	0.002	—	—	—	—
	1N1839	TR	npn, MESA, si	20-45	100amb	175	0.66	45	50	0.1 μ a	—	*8	50	—
	2N475A	TR	npn, DG, si	20-50	200	200	—	45	25	0.02	20	7	10	TI
	2N2042	MO	ppp, AJ, ge	20-50	200	100	2.67	*105	200	25	—	25	0.5	*"Meg-A-Life", TI
	2N2042A	MO	ppp, AJ, ge	20-50	200	100	2.67	*105	200	25	—	25	0.5	—
A 11	2N761	NA	npn, DM, si	20-55	500	200	2.5	45	—	.2	—	—	—	—
	TMT2427	TR	npn, PL, si	*20-60	150amb	175	1.0	40	50	0.010 μ a	4	*6	50	—
	2N406	SY	ppp, AJ, ge	20-80	150	75	3	*20	35	14	—	—	250	—
	2N530	GI	ppp, AJ, ge	22	100	85	2	*15	—	3	14	3	—	*matched pnp, npn
	TR722	IND	ppp, AJ, ge	22	150	2.5	3	45	200	10	15	20	2.5	micromin
	CK22A	RA	ppp, AJ, ge	22.5	80	85	—	20	100	2	6-5	—	1.2	micromin
A 12	CK64A	RA	ppp, AJ, ge	22.5	80	85	—	.29	100	2	22	—	0.8	—
	2N2675	GE	npn, GD, si	*22-76	250	185	1.66	*60	25	0.004	11	*4	13	—
	2N186A	GE	ppp, AJ, ge	24	200	85	4	25	200	16	—	40	0.8	—
	2N189	GE	ppp, AJ, ge	24	75	85	2	25	50	15	15	40	0.8	—
	2N150	TR	npn, GJ, si	*24	150	150	1.33	45	50	0.5	20	*2	15	—
	2N1476	SSD	ppp, AJ, si	24	250	175	1.7	100	100	.05	—	7	1	—
A 13	2N381	SY	ppp, AJ, ge	24-45	200	85	3.3	*25	200	20	—	—	10	TI
	2N44	GE	ppp, AJ, ge	25	240	100	4	45	300	16	6	40	1	MIL, GI
	2N229	SY	ppp, AJ, ge	25	180	85	3	10	100	100	—	—	600	—
	2N330A	SSD	ppp, AJ, si	25	385	2.85	—	30	50	.005	8	—	0.5	NA
	2N460	TS	ppp, AJ, ge	25	200	100	0.3	*45	400	15	—	—	—	TI
	2N564	IND	ppp, AJ, ge	25	150	85	2.5	30	300	3	12	20	0.8	US, GI
A 14	2N592	GI	ppp, AJ, ge	25	150	100	0.2	*20	5	.007	—	35	0.4	Bilateral, TI
	2N726	TI	ppp, DM, si	25	1w	175	—	25	50	—	—	—	—	—
	2N1265	SY	ppp, AJ, ge	25	50	85	0.9	*10	100	100	—	—	600	audio/med. power
	2N1441	NA	ppp, AJ, si	25	400	200	2.28	50	100	0.01	12	25	1	—
	2N524A	MO	ppp, AJ, ge	25-42	225	100	3	*45	500	10	15	40	5	*"Meg-A-Life"
	2N1101	SY	ppp, AJ, ge	25-50	180	75	3.6	*20	100	50	—	—	0.01	RCA
A 15	2N1102	SY	ppp, AJ, ge	25-50	180	75	3.6	*40	100	50	—	—	0.01	Driver, TI
	2N34	SY	ppp, AJ, ge	25-125	150	75	3	*40	100	50	—	—	0.01	Driver, TI
	2N35	SY	ppp, AJ, ge	25-125	180	85	3	*40	100	50	—	—	0.01	Driver, TI
	2N306	SY	ppp, AJ, ge	25-125	180	85	3	*20	100	100	—	—	0.6	IND, RA, US, GI, TI
	2N464	MO	ppp, AJ, ge	26	200	100	2.5	*45	100	6	—	7	1	NA
	2N1474	SSD	ppp, AJ, si	26	230	175	1.7	60	100	.005	—	—	—	*matched pnp, npn
A 16	2N631	GI	ppp, AJ, ge	27	100	85	2	*15	100	3	14	14	—	Sub min
	CK65B	RA	ppp, AJ, ge	27	75	85	1.25	45	—	10	—	—	—	—
	CK65C	RA	ppp, AJ, ge	27	75	85	1.25	45	100	10	—	—	—	Sub min
	2N936	SSD	ppp, AJ, si	28	385	160	2.85	35	50	.005	18	70	.3	NA
	2N244	TI	npn, GJ, si	28-90	750	160	6	60	60	1	—	5	100	NA
	2N757A	TR	N-M	29	500	—	0.30	60	100	0.1	—	—	0.15	—
A 17	2N279	AMP	ppp, AJ, ge	30	125	75	2.5	*30	10	110	10	—	—	—
	2N524	SY	ppp, AJ, ge	30	225	100	3	*45	500	10	—	15	2	GE, MO, TI
	2N594	GI	ppp, AJ, ge	30	150	85	1.67	*20	2	.001	16	15	2	Bilateral, TI
	2N939	SSD	ppp, AJ, si	30	250	175	1.7	35	100	.001	—	7	2	—
	2N1446	IND	ppp, AJ, ge	30	200	85	3.33	45	400	5	6	20	2	—
	2N1474A	SSD	ppp, AJ, si	30	250	175	1.7	60	100	.005	—	7	2	—
A 18	2N1654	RA	ppp, AJ, si	30	250	160	0.54	*80	50	.005	18	70	.2	—
	2N1656	RA	ppp, AJ, si	30	250	160	0.54	*125	50	5	18	70	.2	—
	2N428	AMP	ppp, AJ, ge	30	165	75	0.3	*32	100	—	4	50	1.7	—
	2N331	MO	ppp, AJ, ge	30-70	75	85	1.2	*30	—	1	20	50	4	—
	2N727	TI	ppp, PE, si	*30-90	1000	—	—	20	50	—	—	—	—	—
	2N1372	SY	ppp, AJ, ge	30-90	150	100	2	*25	200	100	—	—	—	—
A 19	2N1373	SY	ppp, AJ, ge	30-90	150	100	2	*45	200	100	—	—	—	—
	2N2392	TI	P-si	*30-90	1000	—	—	20	30	—	—	—	—	—
	2N2711	GE	ppp, P, si	*30-90	200	100	2.67	*18	100	.05 μ a	2.8	*9	—	—
	ST1242	TR	N-GJ	30	200	—	0.80	*40	50	75	—	4	10	—
	2N1372	SY	ppp, AJ, ge	30-90	150	100	2	*25	200	100	—	—	—	—
	2N1373	SY	ppp, AJ, ge	30-90	150	100	2	*45	200	100	—	—	—	—

Now 1~ to 14gc low-noise

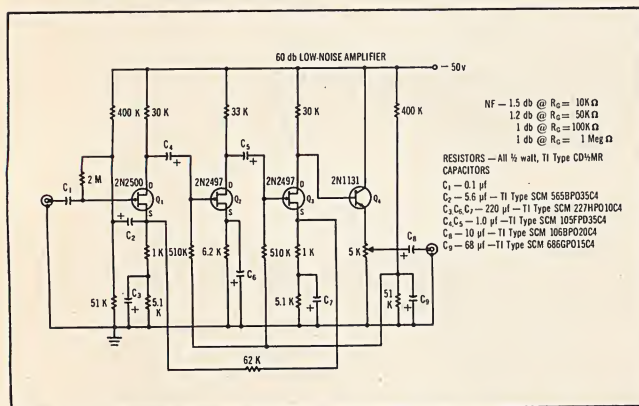
10 DECADES OF LOW-NOISE DEVICES



The units plotted here are representative of a broad range of over 100 low-noise devices TI offers for your low-noise applications.

Low-noise devices for your SUBAUDIO CIRCUITS

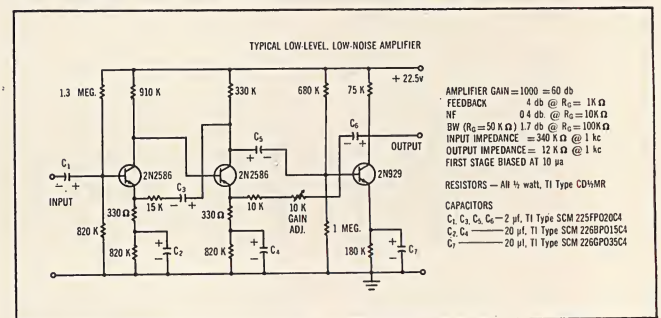
Texas Instruments 2N2497-2500 series field-effect transistors give the design engineer extremely low-noise characteristics — as low as 5 db at 10 cycles. They are ideal for such low-frequency equipment as null-detection apparatus, medical research equipment, oscillographic and magnetic tape recorders, oscilloscopes and all types of low-level transducers. ■ The circuit below illustrates how Texas Instruments 2N2500 silicon field-effect transistors are used to achieve low-noise, low-frequency operation.



This circuit gives you a maximum voltage gain of 60 db \pm 0.5 db from -55°C to 125°C with built-in gain adjustment. You also get good low-frequency response and stable circuit operation. ■ Write for your technical information file on low-noise TI devices for your subaudio applications.

Low-noise devices for your AUDIO CIRCUITS

Now you can design the low-level, high-gain amplifier shown below with typical noise figure as low as 1 db. Advanced low-level planar technology of Texas Instruments 2N929 and 2N2586 transistors makes possible high gain at low current levels, plus the extremely low leakage currents necessary for true low-noise performance.



For high-impedance transducer applications, TI 2N930 and 2N2586 devices permit typical 1 db noise figure at emitter currents below 1 microampere, and generator resistances over 1 megohm. These special characteristics allow direct coupling of low-level, high-impedance sources... advantages previously available only with vacuum tubes and field-effect transistors. High gain at low levels plus very thin regions in these units combine to offer low power consumption and high radiation resistance to make the 2N930 and 2N2586 ideal for space applications. ■ A technical information file on almost 50 TI low-noise devices for audio circuits is yours upon request.

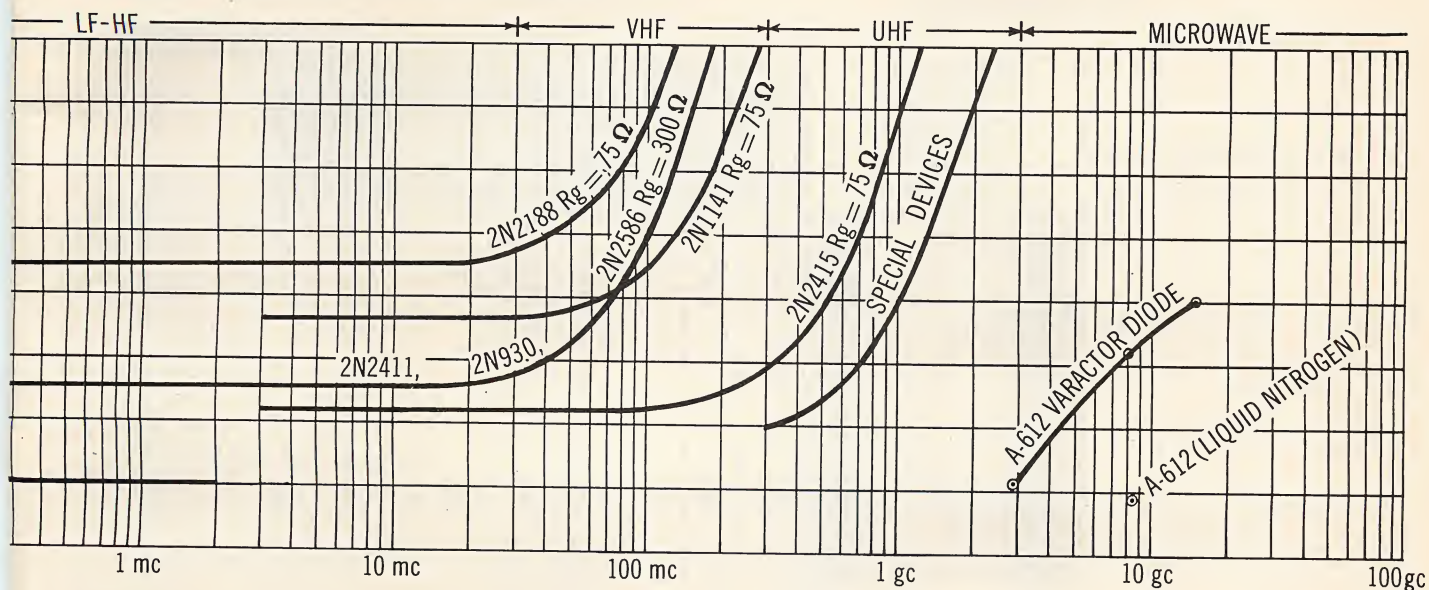
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SEMICONDUCTOR COMPONENTS
DIVISION



solid-state amplification

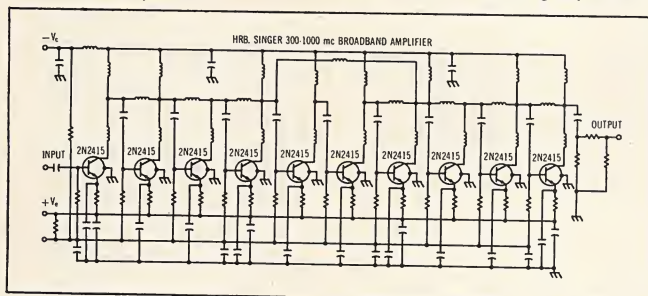
FROM TEXAS INSTRUMENTS



Figures shown are not theoretical; all are achieved measurements from actual circuit operation.

Low-noise devices for your LF-UHF CIRCUITS

For your low-noise, high-frequency receiver and preamplifier applications, TI 2N2415 germanium mesa transistors give you a typical noise figure of 2.4 db at 200 mc, maximum available gain of 15.5 db at 500 mc with a f_{MAX} of 3 gc. ■ In the following circuit, HRB-Singer, Inc. utilizes 2N2415 transistors and "multiple feedback" techniques to achieve a uniform low noise figure, nominally 6 db, over the entire frequency range of 300 to 1000 mc with an average gain of 35 db. Unique design provides stable operation over a temperature range of -30° to $+70^{\circ}$ C and eliminates the need for RF tuning capacitors.



Another line of TI low-noise communications devices is the Dalmesa 2N2188 and TI363 series of germanium alloy diffused mesa transistors. These advanced units offer you ultra-high performance from dc to 100 mc, typical mid-frequency noise figures of less than 2 db, and increased high-frequency stability through guaranteed maximum output capacitance of 2.8 pf at 9 volts. ■ Investigate TI's wide selection of low-noise transistors for LF-UHF circuits by writing for a free fact file on these devices.

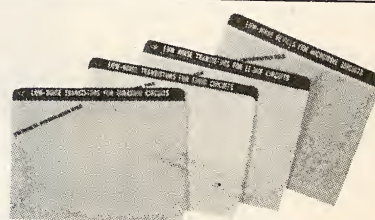
Low-noise devices for your MICROWAVE CIRCUITS

Now you can design microwave circuits for highest frequencies at lowest noise with the new GaAs Pill Varactor Diode from Texas Instruments. These new subminiature devices offer you minimum cutoff frequency of 90 gc to 150 gc at -2 volts with low junction capacitance $-C_j$ @ 0 bias from 0.15 to 0.75 pf. Your production-line requirements for identical plug-in units are met through tight control of junction and package characteristics. ■ These features offer you the lowest package capacitance and inductance in industry today — backed up with TI varactor manufacturing capacity to meet your tightest production schedules. ■ TI GaAs Pill Varactor Diodes are particularly applicable to low-noise parametric amplifiers, harmonic generators, microwave switches, sub-harmonic oscillators, phase shifters and parametric limiters.

FOR FULL INFORMATION...

... write for a fact-filled file of technical data on low-noise TI devices designed for application in your frequency range. Please address your card or letter to Department 605 and specify which of these four information files you desire.

1. SUBAUDIO
2. AUDIO
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4. MICROWAVE



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A continued

Cross Index Key	Type No.	Mfr.	Type	h _{FE} *h _{FE} **C _m	MAX. RATINGS				CHARACTERISTICS						Remarks
					P _c (mw)	T _j (°C)	m _w /°C	V _{CEO} *V _{CBO} (v)	I _C (mA)	I _{CO} (μA)	NF (db)	C _{oe} *C _{ob} **f _{cb} (pF)	f _{ae} *f _T **f _{cb} (mc)		
A 15	2N1243	TR	N-GJ	*30	200	—	0.80	*40	50	75	—	4	10	TI	
	2N2715	GE	npn, P, si	*30-90	200	100	2.67	*18	25	0.05μA	2.8	*5	—	TI	
	2N1432	SY	npn, DD, ge	30-120	80	85	1.3	*35	10	15	—	—	—		
	2N1380	SY	npn, AJ, ge	30-300	150	100	2	*15	200	14	—	—	—		
	2N1381	SY	npn, AJ, ge	30-300	150	100	2	*25	200	100	—	—	—		
A 16	2N532	GI	*	32	100	85	2	*15	—	3	14	14	—	* matched npn, npn MO, TI	
	2N319	GE	npn, AJ, ge	34	225	85	4	20	200	16	—	25	2	"Meg-A-Life"	
	2N444	MO	npn, AJ, ge	34-65	240	—	—	*45	500	10	15	40	5.5		
	2N525A	GE	npn, AJ, ge	34-65	225	100	3	*20	35	14	—	*35	—		
	2N405	RCA	npn, AJ, ge	35	150	71	—	*20	35	14	—	*35	—	TO-18, NA	
A 17	2N406	RCA	npn, AJ, ge	35	150	71	—	*20	35	14	—	*35	—	TO-5 TR, NA	
	2N734	TR	npn, MS, si	35	1w	175	—	*80	50	1	20	5	—		
	2N738	TR	npn, DM, si	35	150	175	—	*125	35	1	—	—	—		
	2N926	NA	npn, AJ, si	35	150	200	2.5	50	—	.005	—	12	0.8		
	2N928	NA	npn, AJ, si	35	150	200	2.5	70	—	.005	—	12	0.8		
A 18	2N1010	RCA	npn, AJ, ge	35	20	—	—	*10	2	10	5	—	*2		
	2N1564	TI	npn, MS, si	35	1.2	175	—	*80	50	1	20	5	50		
	2N1572	TR	npn, DM, si	35	1.2w	175	—	*125	50	1	—	—	—		
	2N2617	AMP	npn, si	35	250	150	2	*25	50	0.001	6	—	3.0		
	BC211	AMP	si	35	250	150	2	*25	50	0.001	6	—	3		
A 19	OC57	AMP	npn, PADT, ge	35	10	55	—	*7	10	1.5	—	—	1.4	TS, KF, TI	
	2N383	SY	npn, AJ, ge	35-110	200	85	3.3	*30	200	20	—	—	10		
	2N190	GE	npn, AJ, ge	36	75	85	2	25	50	16	15	40	1		
	2N187A	GE	npn, AJ, ge	36	200	85	4	25	200	16	20	40	1	TR, USN	
	2N119	TI	npn, GR, si	36-90	150	175	1	*30	25	2	20	—	6	TR, GE, NA, RA, AMP GE, TI	
A 20	2N335	TI	npn, GR, si	36-90	150	175	1	45	25	2	20	—	11		
	2N335A	NA	npn, MS, si	36-90	500	175	2.8	45	—	0.5	—	—	—		
	2N759	NA	npn, DM, si	36-90	500	200	2.5	45	—	0.2	—	—	—		
	2N759A	NA	npn, DM, si	36-90	500	200	2.5	60	—	0.1	—	—	—		
	2N1152	NA	npn, DM, si	36-90	150	175	0.86	45	25	2	—	7	1	TR, TI	
A 21	2N533	GI	*	37	100	85	2	*15	—	3	14	14	—	* matched npn, npn, TI	
	2N1278	TR	N-GJ	*37	150	—	1.00	*40	25	—	—	5	15	Switch	
	2N742	NA	npn, MS, si	40	—	200	1.71	60	100	0.1	—	—	200		
	2N1009	SY	npn, AJ, ge	40	150	85	2.5	*25	20	1	—	—	—		
	2N1176	BE	npn, AJ, ge	40	300	85	6.6	15	300	10	—	—	—		
A 22	2N1176A	BE	npn, AJ, ge	40	300	85	6.6	40	300	10	—	—	—		
	2N1176B	BE	npn, AJ, ge	40	300	85	6.6	60	300	15	—	—	—		
	2N1191	MO	npn, AJ, ge	40	200	100	2.7	*40	200	2	10	*5	1.5	TI	
	2N1566	TI	npn, DM, si	40	1200	175	8.0	60	50	μA	5	—	150		
	2N1678	GI	npn, DR, ge	40	120	85	2	*60	—	3	—	3	—	Trixie Driver	
A 23	BCY11	AMP	si	40	312	150	2.5	*60	500	0.02	7	90	1.5	micromin RF switch	
	BCY12	AMP	si	40	312	150	2.5	*32	500	0.02	7	90	2	2N650	
	CK4A	RA	npn, AJ, ge	40	80	85	24	24	100	2	14	6	6		
	TR-650	IND	npn, AJ, ge	40	150	85	2.5	45	400	1.0	10	20	2		
	TR-653	IND	npn, AJ, ge	40	150	85	2.5	30	400	1.0	10	20	2		
A 24	2N382	SY	npn, AJ, ge	40-76	200	85	3.3	*25	200	20	—	—	10	KF, TI	
	TN T840	TR	npn, MESA, si	40-90	175	—	0.66	45	50	0.1μA	—	*8	50	TI	
	2N480A	TR	npn, DG, si	40-100	200	200	—	45	25	0.02	20	7	11		
	2N929	TI	npn, PL, si	*40-120	600	175	4.0	45	30	0.01μA	2	*6	60		
	2N2387	TI	npn, PL, si	*40-120	1200	175	8.0	45	30	0.01μA	2	6	60		
A 25	ST1244	TR	npn, GJ, si	*40-125	200	150	1.33	20	50	0.8	20	*2	20	TI	
	2N43	GE	npn, AJ, ge	42	240	100	4	45	300	16	6	40	1.3		
	OC79	AMP	npn, PADT, ge	42	550	75	—	*26	300	10	—	—	1.2		
	2N104	RCA	npn, AJ, ge	44	150	—	—	30	*10	—	12	*7	50		
	2N215	RCA	npn, AJ, ge	44	150	—	—	30	*10	10	—	12	*7		
A 26	2N525	GE	npn, AJ, ge	44	225	100	4	*45	500	10	6	25	2.5	MO, SY, TI	
	2N1924	GE	npn, AJ, ge	44	225	85	—	4	500	4	—	—	—	MO, TI	
	2N322	GE	npn, AJ, ge	45	140	85	4	18	100	16	—	25	2.0	Driver, MO, TI	
	2N465	IND	npn, AJ, ge	45	150	85	2.5	*45	200	6	15	20	0.8	MO, RA, US, GI, SY, TI	
	2N595	GI	npn, AJ, ge	45	150	85	1.67	*20	—	2	16	15	4	Bilateral, TI	
A 27	2N924	NA	npn, AJ, si	45	150	200	2.5	40	—	.005	—	12	0.8	Driver, TI	
	2N1098	GE	npn, AJ, ge	45	140	85	4	16	100	16	—	25	—	Driver	
	2N1145	GE	npn, AJ, ge	45	140	85	4	25	100	16	—	40	—	KF	
	2N1372	TI	npn, AJ, ge	45	250	100	3.3	45	200	3	7	—	1.5	KF	
	2N1373	TI	npn, AJ, ge	45	250	100	3.3	45	200	3	7	—	1.5	audio/med. power	
A 28	2N1442	NA	npn, AJ, si	45	400	200	2.28	50	100	0.01	12	25	1		
	2N1447	IND	npn, AJ, ge	45	200	85	3.3	45	400	5	6	20	3		
	2N1451	IND	npn, AJ, ge	45	200	85	3.3	45	400	7.5	9	20	1.5		
	2N1477	SSD	npn, AJ, si	45	250	175	1.7	100	100	2	7	7	1		
	CK65A	RA	npn, AJ, ge	45	80	85	—	24	100	2	—	—	1.0	micromin	

A continued

Cross Index Key	Type No.	Mfr.	Type	h _{FE} *h _{FE} **G _m	MAX. RATINGS				CHARACTERISTICS					Remarks	
					P _c (m _w)	T _i (°C)	m _w /°C	V _{CEO} *V _{CBO} (v)	I _C (m _a)	I _{CO} (μ _a)	NF (db)	C _{oe} *C _{ob} (p _f)	f _{ae} *f _T **f _{ab} (mc)		
A 22	TR721	IND	pnp, AJ, ge	45	150	2.5	3	30	200	10	15	20	3	2N320 US, TI Mega life, TI SY, US	
	2N762	NA	non, DM, si	45-150	500	200	2.5	45	—	0.2	—	—	—		
	2N2676	GE	pnp, AJ, ge	*45-290	250	185	1.66	*60	25	0.004	11	*4	15		
	2N280	AMP	pnp, AJ, ge	47	125	75	2.5	*20	10	150	10	—	0.1		
	OC71N	AMP	pnp, ge	47	110	75	0.45	*30	10	—	10	—	—		
	TR320	IND	pnp, AJ, ge	48	150	85	3	25	100	10	—	25	2.5		
	2N650	MO	pnp, AJ, ge	49	200	100	2.7	*45	500	3	5	—	1.5		
	2N650A	MO	pnp, AJ, ge	49	200	100	2.8	*45	500	10	15	25	1.5		
	2N653	MO	pnp, AJ, ge	49	200	100	2.8	*30	250	5	10	20	1.5		
	2N1186	MO	pnp, AJ, ge	49	200	100	2.7	*60	500	5	5	—	1.5		
A 23	2N43A*	GI	pnp, AJ, ge	50	150	100	2	*45	—	10	18	40	3.5	*MIL, GE, TI MO, TI IND, MO, GI RA, US	
	2N320	GE	pnp, AJ, ge	50	225	85	4	20	200	16	9	—	1.16		
	2N331	BE	pnp, AJ, ge	50	200	85	—	*30	200	10	—	—	—		
	2N363	IND	pnp, AJ, ge	50	150	85	2.5	30	200	10	—	—	—		
	2N422	RA	pnp, FA, ge	50	150	85	—	10	100	6	6.5	—	0.8		
	2N917	FA	non, DP, si	*50	300	200	1.71	15	—	0.004	—	*1.0	*800		
	2N918	FA	non, DP, si	*50	300	200	1.71	15	—	0.004	—	*1.0	*900		
	2N941	SSD	pnp, AJ, si	50	250	175	1.7	8	50	.001	—	7	16		
	2N942	SSD	pnp, AJ, si	50	250	175	1.7	8	50	.001	—	7	10		
	2N1173	WE	pnp, AJ, ge	50	—	100	3.3	*20	200	150	3.0	25	—		TO-18
A 24	2N1174	WE	pnp, AJ, ge	50	—	100	3.3	*20	200	100	3.0	25	—	2N320 Matched TI	
	2N1273	TI	pnp, AJ, ge	50	150	85	2.5	*15	150	3	6.5	—	—		
	2N1274	TI	pnp, AJ, ge	50	150	85	2.5	*25	150	3	6.5	—	—		
	2N1383	TI	pnp, AJ, ge	50	200	85	3.3	*25	200	14	7.0	—	1.5		
	2N1589	TR	N-G-5	50	150	—	1.00	*15	25	—	—	5	5		
	2N1590	TR	N-G-5	50	150	—	1.00	*30	25	—	—	5	5		
	2N1591	TR	N-G-5	50	150	—	1.00	*60	25	—	—	5	5		
	2N1917	SSD	pnp, AJ, si	50	250	175	1.7	8	50	.001	—	7	16		
	2N1918	SSD	pnp, AJ, si	50	250	175	1.7	8	50	.001	—	7	10		
	2N2271	SY	pnp, AJ, ge	50	250	100°C	3.3	*20	500	10	—	—	0.01		
A 25	2N2354	SY	non, AJ, ge	50	180	85	3.0	*20	150	10	—	—	—	2N320 Matched TI	
	BCY10	AMP	si	50	312	150	2.5	*32	500	0.02	7	100	—		1.5
	TR-320	IND	pnp, AJ, ge	50	150	85	2.5	30	200	7.5	—	20	2.5		
	2N214	SY	non, AJ, ge	50-100	180	85	3	*40	100	50	—	—	0.01		
	2N228	SY	non, AJ, ge	50-100	180	85	3	*40	100	100	—	—	0.01		
	2N241A	SY	pnp, AJ, ge	50-100	200	85	3.3	*30	200	16	—	—	10		
	2N270	SY	pnp, AJ, ge	50-100	150	85	2.5	*25	75	12	—	—	0.01		
	2N321	SY	pnp, AJ, ge	50-100	200	85	3.3	*25	200	16	—	—	10		
	2N1059	SY	non, AJ, ge	50-100	180	75	3.6	*20	100	50	—	—	0.01		
	2N408	SY	pnp, AJ, ge	50-135	150	85	2.5	*20	70	14	—	—	—		
A 26	2N109	SY	pnp, AJ, ge	50-150	50	85	0.9	*25	75	12	—	—	—	TI, KF TI, KF "Meg-A-Life" Driver Submin.	
	2N217	SY	pnp, AJ, ge	50-150	—	85	—	*25	75	12	—	—	—		
	2N323	SY	pnp, AJ, ge	50-150	140	85	2.3	*16	100	16	—	—	800		
	2N1374	SY	pnp, AJ, ge	50-150	150	100	2	*25	200	100	—	—	—		
	2N1375	SY	pnp, AJ, ge	50-150	150	100	2	*45	200	100	—	—	—		
	2N526A	MO	pnp, AJ, ge	53-90	225	100	3	*45	500	10	15	40	6.5		
	2N188A	GE	pnp, AJ, ge	54	200	85	4	25	200	16	—	—	40		
	2N191	GE	pnp, AJ, ge	54	75	85	2	25	50	16	15	40	1.2		
	2N758A	TR	N-H	54	500	—	0.30	60	100	0.1	—	—	5		
	CK22B	RA	pnp, AJ, ge	54	75	65	1.25	35	100	10	6.5	—	—		
A 27	CK66B	RA	pnp, AJ, ge	54	75	85	1.25	35	100	10	—	—	—	Submin. Submin. Submin. US, GI Driver, TI micromin RF switch Bilateral, TI	
	CK66C	RA	pnp, AJ, ge	54	75	85	1.25	35	100	10	—	—	—		
	CK261	RA	non, AJ, ge	54	75	85	1.25	35	100	10	—	—	—		
	CK262	RA	non, AJ, ge	54	75	85	1.25	35	100	10	—	—	—		
	2N566	IND	pnp, AJ, ge	55	150	85	2.5	30	300	3	12	20	1		
	2N1097	GE	pnp, AJ, ge	55	140	85	4	16	100	16	—	—	—		
	2N1144	GE	pnp, AJ, ge	55	140	85	4	16	100	16	—	—	—		
	CK27A	RA	pnp, AJ, ge	55	80	85	—	15	400	2	14	11	1.6		
	OC58	AMP	pnp, PADT, ge	55	10	55	—	*7	10	1.5	—	—	—		
	2N596	GI	non, AJ, ge	60	150	85	1.67	20	—	2	16	15	6		
A 28	2N633	IND	pnp, AJ, ge	60	150	85	2.5	35	200	10	—	—	—	RA, US NA	
	2N937	SSD	pnp, AJ, si	60	385	160	2.85	30	50	.005	18	70	0.8		
	2N940	SSD	pnp, AJ, si	60	250	175	1.7	35	100	.001	—	7	0.5		
	2N957	FA	non, DP, si	*60	800	150	6.5	20	—	1.0	—	*4.0	2		
	2N1475	SSD	pnp, AJ, si	60	250	175	1.7	60	100	.005	—	7	1		
	OC60	AMP	pnp, PADT, ge	60	10	55	—	*7	10	1.5	—	—	—		
	TS602	TS	pnp, AJ, ge	*60	200	100	—	*12	400	20	—	—	1.6		
	TS604	TS	pnp, AJ, ge	*60	200	100	—	*20	400	20	—	—	—		
	AC107	AMP	pnp, ge	60	80	75	0.6	*15	5	2.0	3	—	—		
	2N220	RCA	pnp, AJ, ge	65	20	—	—	*10	2	12	6	—	*0.85		

A continued

Cross Index Key	Type No.	Mfr.	Type	h_{fe} $^{*}h_{FE}$ $^{**}G_m$	MAX. RATINGS					CHARACTERISTICS					Remarks
					P_c (mw)	T_i (°C)	$m_w/°C$	V_{CEO} $^{*}V_{CBO}$ (v)	I_C (ma)	I_{CO} (μ a)	NF (db)	C_{oe} $^{*}C_{ob}$ (pf)	f_{ae} $^{*}f_T$ $^{**}f_{ab}$ (mc)		
A 29	2N175	RCA	pnnp,AJ,ge	65	20	—	—	*10	2	12	6	—	*0.85	GI, TI SY	
	2N398A	MO	pnnp,AJ,ge	65	150	100	2	105	200	12	—	—	1		
	2N407	RCA	pnnp,AJ,ge	65	150	71	—	*20	70	14	—	—	—		
	2N408	RCA	pnnp,AJ,ge	65	150	71	—	*20	70	14	—	—	—		
	2N649	RCA	pnnp,AJ,ge	65	100	—	—	*20	50	14	—	—	—		
	2N759A	TR	N-M	65	500	—	0.30	60	100	0.1	—	5	100	TI	
	2N1448	IND	pnnp,AJ,ge	65	200	85	3.33	45	400	5	6	20	4		
2N1452	IND	pnnp,AJ,ge	65	200	85	3.33	45	400	7.5	9	20	2.2			
A 30	OC74	AMP	pnnp,PAOT,ge	65	550	75	—	20	300	10	—	—	1.5	RA, US	
	2N2043	MO	pnnp,AJ,ge	65-100	200	100	2.67	105	200	25	—	25	0.75		
	2N2043A	MO	pnnp,AJ,ge	65-100	200	100	2.67	105	200	25	—	25	0.75		
	2N323	GE	pnnp,AJ,ge	68	140	85	4	18	100	16	—	25	2.5		
	2N281	AMP	pnnp,PAOT,ge	70	165	75	—	*32	250	4.5	—	—	0.9	SY	
	2N282	AMP	pnnp,ge	70	167	75	—	*32	250	4.5	—	—	0.9		
	2N361	IND	pnnp,AJ,ge	70	150	85	2.5	45	200	10	—	—	—		
	2N591	RCA	pnnp,AJ,ge	70	100	—	—	*32	40	7	—	—	0.7		
	2N647	RCA	pnnp,AJ,ge	70	100	—	—	*25	50	14	—	—	—	TO-18, TR, NA NA KF	
	2N735	TI	npn,MS,si	70	1.0	175	—	80	50	1	20	5	50		
2N739	TI	npn,DM,si	70	1w	175	—	*125	70	1	—	—	—			
2N1352	IND	pnnp,AJ,ge	70	150	85	2.5	30	200	2.5	—	18	2.5			
A 31	2N1565	TI	npn,MS,si	70	1.2	175	—	*80	50	1	20	5	50	NA	
	2N1573	TI	npn,DM,si	70	1.2w	175	—	*125	50	1	—	—	—		
	2N213	SY	npn,AJ,ge	70-250	150	85	2.3	*40	100	50	—	—	0.01		
	2N1251	SY	npn,AJ,ge	70-250	150	85	2.5	*20	100	50	—	—	7.5		
	TR-383	IND	pnnp,AJ,ge	72	200	85	3.33	25	200	7.5	—	20	1.8	2N383	
	2N527A	MO	pnnp,AJ,ge	72-121	225	100	3	*45	500	10	15	40	7.0	"Meg-A-Life" SO	
	2N241	GE	pnnp,AJ,ge	73	100	85	3	25	200	16	—	40	1.3		
	2N109	RCA	pnnp,AJ,ge	75	150	—	—	25	70	14	—	—	—		
	2N192	GE	pnnp,AJ,ge	75	75	85	2	25	50	16	15	40	1.5		
	2N217	RCA	pnnp,AJ,ge	75	150	—	—	25	70	14	—	—	—		
2N361	US	pnnp,AJ,ge	*75	150	85	—	30	200	10	13	—	1.5	TI audio/med. power Trixie driver lg FE lg FE lg FE 2N323		
2N1192	MO	pnnp,AJ,ge	75	200	100	2.7	*40	200	2	10	—	2			
2N1443	NA	pnnp,AJ,si	75	400	200	2.28	50	100	0.01	12	25	1			
2N1672	GI	npn,AJ,ge	75	120	85	0.5	*40	50	5	—	—	—			
C620	CT	pnnp,AJ,si	**75	250	160	2	10	—	—	3.5	15	—			
C622	CT	pnnp,AJ,si	**75	250	160	2	10	50	—	1.5	15	—			
C624	CT	pnnp,AJ,si	**75	250	160	2	10	50	—	0.4	15	—			
GT-74	GI	pnnp,AJ,ge	75	150	100	2	25	—	5	6	35	—			
GT-81	GI	pnnp,AJ,ge	75	150	100	2	25	—	5	16	35	—			
TR-323	IND	pnnp,AJ,ge	75	150	85	2.5	16	200	7.5	—	20	2.5			
A 33	2N1376	SY	pnnp,AJ,ge	75-150	150	100	2	*25	200	100	—	—	—	TI	
	2N1431	SY	npn,AJ,ge	75-150	180	75	3.6	*25	100	50	—	—	10		
	2N2712	GE	npn,P,si	*75-225	200	100	2.67	*18	100	0.05 μ a	2.8	*9	—		
	2N2716	GE	npn,P,si	75-225	200	100	2.67	*18	25	0.05 μ a	2.8	5	—		
	2N1950	IND	npn,DM,si	75-250	600	175	4	20	—	0.01	—	—	—		
	2N1951	IND	npn,DM,si	75-250	600	175	4	30	—	0.01	—	—	—		
	2N1952	IND	npn,DM,si	75-250	600	175	4	40	—	0.01	—	—	—		
	2N1279	TR	N-GJ	*76	150	—	1.00	*40	25	—	—	5	15		
A 34	2N120	TI	npn,GR,si	76-333	150	175	1	*30	25	2	20	—	7	TR TR, GE, NA, RA, AMP	
	2N336	TI	npn,GR,si	76-333	150	175	1	45	25	2	20	—	13		
	2N336A	NA	npn,MS,si	76-333	500	175	2.8	45	—	0.5	—	—	—		
	2N760	NA	npn,DM,si	76-333	500	200	2.5	45	—	0.2	—	—	—		
	2N760A	NA	npn,DM,si	76-333	500	200	2.5	60	—	0.1	—	—	—		
	2N1153	NA	npn,DM,si	76-333	150	175	0.86	45	25	2	—	7	1		
	2N321	GE	pnnp,AJ,ge	80	225	85	4	20	200	16	—	25	3		
	2N527	SY	pnnp,AJ,ge	80	225	85	3.7	*45	500	10	—	—	3.3	TS, TI US, SY, TI TI US, TI /	
2N651	MO	pnnp,AJ,ge	80	200	100	2.8	*45	500	3	5	—	2			
2N651A	MO	pnnp,AJ,ge	80	200	100	2.8	*45	500	10	15	—	2.0			
2N654	MO	pnnp,AJ,ge	80	200	100	2.8	*30	250	5	10	—	2.0			
2N780	TI	npn,DM,si	80	1w	175	—	45	50	.0005	—	—	—	—		
A 35	2N1187	MO	pnnp,AJ,ge	80	200	100	2.7	*60	500	5	5	—	2	GI, KF KF KF KF	
	2N1370	TI	pnnp,AJ,ge	80	150	85	2.5	25	150	3	6.5	—	2.0		
	2N1371	TI	pnnp,AJ,ge	80	150	85	2.5	25	150	3	6.5	—	2		
	2N1374	TI	pnnp,AJ,ge	80	250	100	3.3	25	200	3	6.5	—	2		
	2N1375	TI	pnnp,AJ,ge	80	250	100	3.3	45	200	3	6.5	—	2		
	2N1382	TI	pnnp,AJ,ge	80	200	85	—	25	200	14	6.5	—	2	MO micromin RF switch	
	2N1449	IND	pnnp,AJ,ge	80	200	85	3.33	45	400	5	6	20	5		
	2N1926	GE	pnnp,AJ,ge	80	225	85	—	40	500	4	—	—	—		
	CK28A	RA	pnnp,AJ,ge	80	80	85	—	12	400	80	—	14	17		
OC59	AMP	pnnp,PAOT,ge	80	10	55	—	*7	10	1.5	—	—	2.2			

SHOCKLEY SEMICONDUCTOR DEVICES

TYPE E 4-LAYER DIODES

1-N SERIES

Type	Switching Voltage (V_s) in volts		Holding Current (I_h) in milliamps		Type	Switching Voltage (V_s) in volts		Holding Current (I_h) in milliamps	
	25°C	-40° to 85°C	25°C	-40°C		25°C	-40° to 85°C	25°C	85°C
1N3831	20 ± 4	14-25	0.5-15	40 max	1N3839	20 ± 4	14-25	14-50	5 min
1N3832	25 ± 4	19-30	0.5-15	40 max	1N3840	25 ± 4	19-30	14-50	5 min
1N3833	30 ± 4	23-36	0.5-15	40 max	1N3841	30 ± 4	23-36	14-50	5 min
1N3834	35 ± 4	28-41	0.5-15	40 max	1N3842	35 ± 4	28-41	14-50	5 min
1N3835	40 ± 4	32-46	0.5-15	40 max	1N3843	40 ± 4	32-46	14-50	5 min
1N3836	45 ± 4	37-51	0.5-15	40 max	1N3844	45 ± 4	37-51	14-50	5 min
1N3837	50 ± 4	41-57	0.5-15	40 max	1N3845	50 ± 4	41-57	14-50	5 min
1N3838	100 ± 10	80-115	0.5-15	40 max	1N3846	100 ± 10	80-115	14-50	5 min

COMMERCIAL SERIES

MIL-LINE SERIES

SERIES A (BROAD SPEC)

Type	Switching Voltage (V_s) in volts		Holding Current (I_h) in milliamps	Type	Switching Voltage (V_s) in volts		Holding Current (I_h) in milliamps	Type	Switching Voltage (V_s) in volts		Holding Current (I_h) in milliamps
	25°C	-60° to 125°C			25°C	-60° to 125°C			25°C	85°C	
4E20-8	20 ± 4	1-15	14-45	4E20M-8	20 ± 4	14-25	1-15	4E20A	20 ± 6	0.5-60	
4E20-28	20 ± 4	1-15	14-45	4E20M-28	20 ± 4	14-25	14-45	4E30A	30 ± 6	0.5-60	
4E30-8	30 ± 4	1-15	14-45	4E30M-8	30 ± 4	23-36	1-15	4E40A	40 ± 6	0.5-60	
4E30-28	30 ± 4	1-15	14-45	4E30M-28	30 ± 4	23-36	14-45	4E50A	50 ± 6	0.5-60	
4E40-8	40 ± 4	1-15	14-45	4E40M-8	40 ± 4	32-46	1-15				
4E40-28	40 ± 4	1-15	14-45	4E40M-28	40 ± 4	32-46	14-45				
4E50-8	50 ± 4	1-15	14-45	4E50M-8	50 ± 4	41-57	1-15				
4E50-28	50 ± 4	1-15	14-45	4E50M-28	50 ± 4	41-57	14-45				
4E100-8	100 ± 10	1-15	14-45	4E100M-8	100 ± 10	80-115	1-15				
4E100-28	100 ± 10	1-15	14-45	4E100M-28	100 ± 10	80-115	14-45				
4E200-8	200 ± 20	1-15	14-45	4E200M-8	200 ± 20	160-230	1-15				
4E200-28	200 ± 20	1-15	14-45	4E200M-28	200 ± 20	160-230	14-45				

TYPE J 4-LAYER DIODES

COMMERCIAL SERIES

MIL-LINE SERIES for extended temperature ranges

Type	Switching Voltage (V_s) in volts		Holding Current (I_h) in milliamps	Type	Switching Voltage (V_s) in volts		Holding Current (I_h) in milliamps
	25°C	-60° to 105°C			25°C	-60° to 105°C	
4J50-5	50 ± 5	1-10	9-45	4J50M-5	50 ± 5	41-57	1-10
4J50-25	50 ± 5	1-10	9-45	4J50M-25	50 ± 5	41-57	9-45
4J100-5	100 ± 10	1-10	9-45	4J100M-5	100 ± 10	80-115	1-10
4J100-25	100 ± 10	1-10	9-45	4J100M-25	100 ± 10	80-115	9-45
4J200-5	200 ± 20	1-10	9-45	4J200M-5	200 ± 20	160-230	1-10
4J200-25	200 ± 20	1-10	9-45	4J200M-25	200 ± 20	160-230	9-45

TYPE G 4-LAYER DIODES

COMMERCIAL SERIES

MIL-LINE SERIES for extended temperature ranges

Type	Switching Voltage (V_s) in volts		Holding Current (I_h) in milliamps	Type	Switching Voltage (V_s) in volts		Holding Current (I_h) in milliamps
	25°C	-60° to 105°C			25°C	-60° to 105°C	
4G50	50 ± 5	1-50	1-50	4G50M	50 ± 5	41-57	1-50
4G100	100 ± 10	1-50	1-50	4G100M	100 ± 10	80-115	1-50
4G200	200 ± 20	1-50	1-50	4G200M	200 ± 20	160-230	1-50



New! NPN HIGH FREQUENCY SILICON POWER TRANSISTOR

MAXIMUM RATINGS at 25°C base temperature unless otherwise stated

CHARACTERISTICS at 25°C unless otherwise stated

	3TX002	3TX003	3TX004	Condition	3TX002	3TX003	3TX004
BVCBO	100 V	100 V	60 V	F_T min	10 V, 2.5 A	150 MC	150 MC
I_C	5 A	5 A	5 A	Beta min	5 V, 5 A	30	10
PAVERAGE	60 W	45 W	45 W	VCE max	5 A, 0.5 A	1V	2V
R_T	2.5°C/W	3.3°C/W	3.3°C/W	ICBO max	150°C 3TX002 - 80 V	10 MA	10 MA
Temperature-Storage	-65 to 200°C	-65 to 200°C	-65 to 200°C		3TX003 - 80 V	10 MA	10 MA
Temperature-Operating	-65 to 175°C	-65 to 175°C	-65 to 175°C		3TX004 - 50 V	10 MA	10 MA

A MAJOR SOURCE FOR 4-LAYER DIODES AND HIGH FREQUENCY SILICON POWER TRANSISTORS.
For further information on these and other Shockley solid-state devices, call or write your nearest Clevite distributor or contact:

CLEVITE TRANSISTOR, Palo Alto Plant, 1801 Page Mill Road, Palo Alto, California

CLEVITE

TRANSISTOR

A Division of Clevite Corporation

ON READER-SERVICE CARD CIRCLE 441

A continued

Cross Index Key	Type No.	Mfr.	Type	h _{FE} *h _{FE} **C _n	MAX. RATINGS			CHARACTERISTICS							Remarks
					P _c (mw)	T _i (°C)	V _{CEO} *V _{CBO} (v)	I _C (ma)	I _{CO} (μa)	NF (db)	C _{oe} *C _{ob} (pF)	f _{ae} *f _T **f _{ab} (mc)			
A 36	TR-321	IND	pnp,AJ,ge	80	150	85	30	200	7.5	—	20	3.1	2N321		
	2N543A	TR	nnp,DG,si	80-201	200	200	45	25	0.02	—	—	15			
	2N736A	TI	M,si	80-20	1000	—	80	100	—	—	—	—			
	2N1566A	TI	M,si	80-20	1200	—	80	100	—	—	—	—			
	TNT841	TR	nnp,MESA,si	80-33	100amb	175	45	50	0.1μa	—	*8	50			
	2N2648	GI	pnp,AJ,ge	80-5C0	250	100	*35	1	3μa	—	*18	*10	MO		
A 37	2N527	GE	pnp,AJ,ge	81	225	100	*45	50	10	6	25	3.3	Driver, MO, TI		
	2N324	GE	pnp,AJ,ge	85	140	85	4	18	100	16	—	3	US, GI, RA, SY, TI		
	2N466	MO	pnp,AJ,ge	90	200	100	*35	100	6	15	—	1			
	2N1247	TI	nnp,P _L ,si	*90	600	175	6	30	0.005μa	4	7	60			
	2N1706	TS	—	90	200	100	*25	400	10	—	—	3	TI		
	2N1707	TS	—	90	200	100	*30	400	15	—	—	3	TI		
A 38	CK66A	RA	pnp,AJ,ge	90	80	85	20	100	2	22	—	1.2	micromin		
	OC75	AMP	pnp,AJ,ge	90	125	75	*30	50	5	—	—	0.75			
	OC75N	AMP	pnp,ge	90	110	75	*30	10	4.5	15	—	—			
	2N2171	TS	pnp,AJ,ge	*90-250	500	100	*50	400	10	3.5	*20	**7.5	KF		
	2N1376	TI	pnp,AJ,ge	95	250	100	45	200	7	5.5	40	2	KF		
	2N1377	TI	pnp,AJ,ge	95	250	100	45	200	3	5.5	*14	2	Output		
A 39	2N2375	PH	pnp,AJ,ge	95	250	100	*35	500	2	—	—	*15			
	2N207	PH	pnp,AJ,ge	100	50	65	*12	20	4	5	—	**2			
	2N207A	PH	pnp,AJ,ge	100	50	65	*12	20	4	2	—	**2	IND, US		
	2N207B	PH	pnp,AJ,ge	100	150	85	20	400	10	—	—	1.2	RA, US		
	2N360	IND	pnp,AJ,ge	100	150	85	2.5	100	200	—	—	—			
	2N362	PH	pnp,AJ,ge	100	25	65	*50	25	8	—	—	—			
A 40	2N534	PH	pnp,AJ,ge	100	50	85	*20	20	6	10	—	**2			
	2N535	PH	pnp,AJ,ge	100	50	85	*20	20	6	5	—	**2			
	2N535A	PH	pnp,AJ,ge	100	50	85	*20	20	6	0	—	**2			
	2N535B	PH	pnp,AJ,ge	100	50	85	*20	20	6	0	—	**2	US, GI		
	2N568	IND	pnp,AJ,ge	100	150	85	30	300	3	12	20	1.5	RA, US, GI		
	2N632	IND	pnp,AJ,ge	100	150	85	2.5	200	10	—	—	1			
A 41	2N736	TI	nnp,MS,si	100	1.0	175	*80	50	1	20	5	50	TO-18, TR, FA, NA		
	2N740	TI	nnp,DM,si	100	1w	175	*125	100	1	—	—	—	TR, NA		
	2N1380	TI	pnp,AJ,ge	100	250	100	12	200	3	5.5	40	2			
	2N1381	TI	pnp,AJ,ge	100	250	100	25	200	3	5.5	40	2			
	CE21	CT	pnp,AJ,si	**100	250	160	2	50	—	3.5	15	—	lg FE		
	CE23	CT	pnp,AJ,si	**100	250	160	2	50	—	1.5	15	—	lg FE		
A 42	CE25	CT	pnp,AJ,si	**100	250	160	2	50	—	0.4	15	—	lg FE		
	2N1574	TI	nnp,DM,si	100	1.2w	175	*125	50	1	—	—	—	TR		
	2N383	IND	pnp,AJ,ge	100	150	85	25	200	10	—	50	1.8	2N383		
	4JX1A547	GE	pnp,AJ,ge	*10-200	150	75	*20	100	6μa	6	*12	*10			
	2N213A	SY	nnp,AJ,ge	10-250	180	85	*40	100	50	—	—	10			
	2N930	TI	nnp,P _L ,si	*10-300	600	175	45	30	0.01μa	2	*6	60			
A 43	2N1944	IND	nnp,DM,si	10-300	600	175	4	20	0.01	—	—	—			
	2N1945	IND	nnp,DM,si	10-300	600	175	4	30	0.01	—	—	—			
	2N1946	IND	nnp,DM,si	10-300	600	175	4	40	0.01	—	—	—			
	2N1947	IND	nnp,DM,si	10-300	600	175	4	20	0.01	—	—	—			
	2N1948	IND	nnp,DM,si	10-300	600	175	4	30	0.01	—	—	—			
	2N1949	IND	nnp,DM,si	10-300	600	175	4	40	0.01	—	—	—			
A 44	2N2388	TI	nnp,P _L ,si	*100-300	1200	175	8.0	45	0.01μa	2	*6	60	Submin.		
	CK67B	RA	pnp,AJ,ge	118	75	85	1.25	35	10	—	—	—	Submin.		
	CK67C	RA	pnp,AJ,ge	118	75	85	1.25	35	10	—	—	—	Submin.		
	2N265	GE	pnp,AJ,ge	118	75	85	2	25	10	15	40	1.5	Driver		
	2N1705	TS	—	10	200	100	*18	400	10	—	—	4	TI		
	GT-109	GI	pnp,AJ,ge	10	150	100	*25	100	6	16	35	3.5	Driver, MO, TI		
A 45	2N508	GE	pnp,AJ,ge	1.2	140	85	18	100	16	—	—	25	micromin RF switch		
	2N1018	KF	pnp,AJ,ge	120	80	85	8	400	2	—	14	25			
	2N2431	AMP	pnp,ge	120	165	75	*32	150	10	—	4	10			
	ST1290	TR	N-GJ	120	200	—	0.80	50	75	—	—	1.7			
	2N2586	AMP	TI	nnp,P _L ,si	*120-360	600	4.0	45	0.002μa	1.5	*6	60			
	2N2430	AMP	nnp,ge	*25	280	90	3.3	30	—	—	—	25			
A 46	2N2614	RCA	pnp,AJ,ge	*25	100	100	2.2	50	6.5	—	—	10			
	2N2706	AMP	pnp,ge	25	280	90	0.37	*32	200	—	—	2.5			
	2N2707	AMP	pnp,ge	25	280	90	0.37	*32	200	—	—	2.5			
	AC127	AMP	nnp,ge	25	280	90	3.3	30	—	—	—	2.5			
	TR-508	IND	pnp,AJ,ge	25	150	85	2.5	200	8	—	20	3.5	2N508		
	2N652	MO	pnp,AJ,ge	130	200	100	2.7	500	3	5	—	2.5	SY, US, TI		
A 47	2N652A	MO	pnp,AJ,ge	130	200	100	2.8	500	10	15	—	2.5	TI		
	2N655	MO	pnp,AJ,ge	130	200	100	2.8	250	5	10	—	2.5	US, TI		
	2N1188	MO	pnp,AJ,ge	130	200	100	2.7	500	5	5	—	2.5			
	2N1248	TI	nnp,P _L ,si	*130	600	175	4.0	30	0.010μa	4	7	60			

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The First Complementary Silicon Planar Transistors for a broad range of applications are discussed in a new 32-page brochure. ☐ The aim of this "printed seminar" is to familiarize potential users of advanced silicon planar transistors with the advantages and applications of Sperry's new low-level, low-noise, high beta complementary NPN and PNP transistors. The brochure comprehensively reviews the advantages in reducing weight, volume and cost of equipment in circuit applications in addition to detailed parameter distribution and variation curves. ☐ Requests for the Sperry Silicon Planar Transistor Brochure are to be made on company letterhead. ☐ Sales Offices: Chicago, Illinois; Los Angeles, California; Oakland, New Jersey; Medford, Massachusetts; Sykesville, Maryland; Bethpage, Long Island, New York. ☐ SPERRY SEMICONDUCTOR, Norwalk, Connecticut.

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A continued

Cross Index Key	Type No.	Mfr.	Type	h_{fe} * h_{FE} ** G_m	MAX. RATINGS				CHARACTERISTICS						Remarks
					P_c (mw)	T_j (°C)	$m_w/°C$	V_{CEO} * V_{CBO} (v)	I_C (ma)	I_{CO} (μ a)	NF (db)	C_{oe} * C_{ob} (pf)	f_{ae} * f_T ** f_{ab} (mc)		
A 43	2N78	GE	npn, RG, ge	*135	65	85	1.1	15v	20	0.7	12	*3	*9	IND, US GI RA BE	
	2N78A	GE	npn, RG, ge	*135	65	85	1.1	20	20	0.7	12	3	9		
	2N1592	TR	N-G5	140	150	—	1.00	*15	25	—	—	5	5		
	2N1593	TR	N-GJ	140	150	—	1.00	30	25	—	—	5	5		
	2N1594	TR	N-GJ	140	150	—	1.00	*60	25	—	—	5	5		
	2N359	RA	pnnp, AJ, ge	150	150	85	2.5	45	200	10	—	—	1		
	2N570	IND	pnnp, AJ, ge	150	150	1T	2.5	30	300	3	12	20	2		
	2N631	IND	pnnp, AJ, ge	150	150	85	2.5	25	200	10	—	—	1.2		
	2N1008A	SY	pnnp, AJ, ge	150	400	85	6.6	*40	300	500	—	—	25		
	2N1471	IND	pnnp, AJ, ge	150	200	85	3.33	12	200	2.5	—	18	5		
A 44	2N1193	MO	pnnp, AJ, ge	160	200	100	2.7	*40	200	2	10	—	2.5	TI tg FE tg FE IND, SY, US, TI micromin MO, RA, US GI	
	2N2613	RCA	pnnp, AJ, ge	160	100	100	2.2	*13	10	4	5	—	*10		
	C632	CT	pnnp, AJ, si	**175	250	160	2	250	50	—	—	2	—		
	C633	CT	pnnp, AJ, si	**175	250	160	2	350	50	—	—	2	—		
	2N467	MO	pnnp, AJ, ge	180	200	100	2.5	*35	100	6	—	—	1.2		
	CK67A	RA	pnnp, AJ, ge	180	80	85	—	15	100	2	22	—	—		
	2N467	GI	pnnp, AJ, ge	200	120	85	2	*35	—	10	16	40	0.5		
	2N169A	GE	npn, RG, ge	*200	75	85	1.25	*25	25	0.9	6	*2.4	*9		
	2N572	IND	pnnp, AJ, ge	200	150	85	2.5	30	300	3	12	20	3		
	2N1378	TI	pnnp, AJ, ge	200	250	100	3.3	12	200	3	4	40	3		
A 45	2N1379	TI	pnnp, AJ, ge	200	250	100	3.3	25	200	3	4	40	3	tg FE Output, TI TI tg FE tg FE tg FE tg FE	
	C631	CT	pnnp, AJ, si	**200	250	160	2	150	50	—	—	2	—		
	2N2374	PH	pnnp, AJ, ge	210	250	100	3.3	*35	500	2	—	*14	**15		
	2N2429	AMP	pn p, ge	220	165	75	3.3	*32	30	—	4	—	2.3		
	2N1185	MO	pnnp, AJ, ge	260	200	100	2.7	*45	500	5	5	—	3		
	2N1194	MO	pnnp, AJ, ge	280	200	100	2.7	*40	200	2	10	—	3		
	C640	CT	pnnp, AJ, si	**200	675	160	5	35	50	—	—	8	20		
	C641	CT	pnnp, AJ, si	**40	675	160	5	35	50	—	—	8	30		
	C642	CT	pnnp, AJ, si	**60	675	160	5	35	50	—	—	8	40		
	C643	CT	pnnp, AJ, si	**90	675	160	5	35	50	—	—	8	50		
A 46	C644	CT	pnnp, AJ, si	12,000	675	160	5	35	50	—	—	8	60	tg FE USAF, TI m. pair 2N2375, TI	
	SST610	SSE	npn, DM, si	12,000	500	150	4	*60	500	0.3ma	8	20	*0.120		
	2N461	MO	pnnp, AJ, ge	—	200	100	2.8	*45	100	10	20	—	0.7		
	2N943	SSD	pnnp, AJ, si	—	250	175	1.7	18	50	—	—	7	1		
	2N944	SSD	pnnp, AJ, si	—	250	175	1.7	18	50	—	—	7	1		
	2N945	SSD	pnnp, AJ, si	—	250	175	1.7	50	50	—	—	7	1		
	2N946	SSD	pnnp, AJ, si	—	250	175	1.7	80	50	—	—	7	1		
	2N1919	SSD	pnnp, AJ, si	—	250	175	1.7	18	50	—	—	7	1		
	2N1920	SSD	pnnp, AJ, si	—	250	175	1.7	18	50	—	—	7	1		
	2N1921	SSD	pnnp, AJ, si	—	250	175	1.7	50	50	—	—	7	1		
2N1922	SSD	pnnp, AJ, si	—	250	175	1.7	80	50	—	—	7	1			
2N2376	PH	pnnp, AJ, ge	—	250	100	3.3	*35	500	2	—	*14	**15			



high gain

New Darlington Amplifier Transistor In 4 Lead TO-18 Package features very high beta — as high as 2,000 minimum at 100 μA . . . very low leakage — as low as 1nA maximum at 30 volts . . . low noise, typically 2 db. ☐ These microelectronic devices contain two interconnected NPN silicon planar transistors which provide extremely high current gain in a single TO-18 package. ☐ The design economies and characteristics of these devices are particularly well-suited for high impedance amplifier inputs, low noise amplifiers and high gain stages. ☐ Production quantities are presently available for new Sperry types; 2N2723, 2N2724 and 2N2725. ☐ Sales Offices: Chicago, Illinois; Los Angeles, California; Oakland, New Jersey; Medford, Massachusetts; Sykesville, Maryland; Bethpage, L. I., New York. ☐ For complete details, write for technical bulletin. SPERRY SEMICONDUCTOR, Norwalk, Connecticut.

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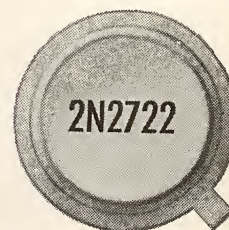
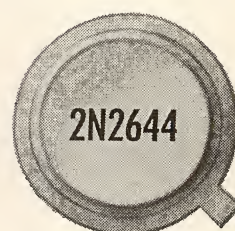
HIGH FREQUENCY

Includes types ranging up to and above the vhf range. In order of increasing f_{ae} , f_{ab} , or f_T .

Cross Index Key	Type No.	Mfr.	Type	f _{ae} *f _T **f _{ab} (mc)	P _c (mw)	MAX. RATINGS			CHARACTERISTICS					Remarks
						T _i (°C)	mw/°C	V _{CEO} *V _{CBO} (v)	I _C (ma)	h _{fe} *h _{FE}	I _{CO} (μa)	NF (db)	C _{oe} *C _{ob} (pf)	
HF 1	2N444A	GI	npn,AJ,ge	1	150	100	2	*40	—	25	2	12	14	TI
	2N707	PSI	npn,TDP,si	1	.006	175	56	—	12	.005	300	6	.2	
	2N988	PSI	npn,TDP,si	1	.006	175	20	—	70	.05	250	8	.32	
	2N989	PSI	npn,TDP,si	1	.006	175	20	—	70	.05	250	11	.63	
	2N1024	SSD	npn,AJ,si	**1	250	175	1.7	15	100	9	0.025	—	7	NA, KF
HF 2	2N1025	SSD	npn,AJ,si	**1	250	175	1.7	35	100	9-22	0.025	—	7	NA, KF
	2N916	PSI	npn,TDP,si	1.2	.006	200	45	—	120	.001	300	—	—	
	2N2656	PSI	npn,TDP,si	1.2	.006	200	25	200	50	.01	250	10	.05	
	PT720	PSI	npn,TDP,si	1.2	.006	200	25	200	80	5	250	15	.05	
	PT886	PSI	npn,TDP,si	1.6	.01	175	22	—	—	.3	180	—	.150	
	PT887	PSI	npn,TDP,si	1.6	.01	175	45	—	—	.3	180	6	.750	
	PT888	PSI	npn,TDP,si	1.6	.01	175	45	—	—	.3	180	4	1.000	
	2N94	SY	npn,AJ,ge	2	150	85	2.5	*20	50	50	50	—	—	
	2N139	SY	npn,AJ,ge	2(min.)	80	85	.75	*20	15	22-110	50	—	—	
	2N193	SY	npn,AJ,ge	2	150	85	2.5	*18	50	9	50	—	—	
HF 3	2N194	SY	npn,AJ,ge	2	150	85	2.5	*18	50	10	50	—	—	Mixer
	2N194A	SY	npn,AJ,ge	2	150	85	2.5	*18	50	10	50	—	—	Converter
	2N211	SY	npn,AJ,ge	2	50	70	1.1	*10	50	5-15	20	—	—	
	2N233A	SY	npn,AJ,ge	2	150	85	2.5	*18	50	30	50	—	—	GI
	2N413A	SY	npn,AJ,ge	2	150	85	2.5	*15	200	—	10	—	—	
	2N515	SY	npn,AJ,ge	2	50	75	1	*18	10	25-50	50	—	—	
	2N516	SY	npn,AJ,ge	2	50	75	1	*18	10	5-15	50	—	—	
	2N517	SY	npn,AJ,ge	2	50	75	1	*18	10	10-60	50	—	—	
	2N519A	GI	npn,AJ,ge	2	150	100	2	*25	—	25	1	12	14	IND, KF
	2N1026	SSD	npn,AJ,si	**2	250	175	1.7	35	100	18-44	0.025	—	7	KF, NA
HF 4	2N1469	SSD	npn,AJ,si	**2	150	150	1.2	35	100	36	25	—	7	KF
	2N1840	PSI	npn,TDP,si	2	.013	175	25	500	15	.3	180	—	—	
	2N413	RA	npn,FA,ge	2.5	150	85	—	18	200	30	2.0	7	—	IND, US, KF, GI
	2N1342	PSI	npn,TDP,si	2.8	.018	175	150	300	12	.01	190	8	.7	
	2N356	RCA	npn,AJ,ge	3	100	85	1.67	20	—	—	5	—	12	GI, SY, TI
	2N438	GI	npn,AJ,ge	3	100	85	1.67	*30	—	—	10	—	12	TI
	2N438A	GI	npn,AJ,ge	3	150	85	2.5	*30	—	—	10	—	12	RA, TI
	2N445A	GI	npn,AJ,ge	3	150	100	2	*30	—	70	2	12	14	TI
	2N481	US	npn,AJ,ge	3	200	85	3	30	20	50	3	—	14	
	2N1302	TI	npn,ge	3	150	100	2.0	*25	300	20*	3	3.6	12	
HF 5	2N1564	PSI	npn,TDP,si	3	.02	175	80	50	30	.01	190	—	—	
	2N1565	PSI	npn,TDP,si	3	.02	175	80	50	60	.01	190	—	—	
	2N1566	PSI	npn,TDP,si	3	.02	175	80	50	130	.01	190	—	—	
	2N1889	PSI	npn,TDP,si	3	.017	200	100	—	80	.001	190	—	—	
	2N1890	PSI	npn,TDP,si	3	.017	200	100	—	200	.001	190	—	—	
	2N1893	PSI	npn,TDP,si	3	.017	200	120	500	80	.001	190	—	—	
	2N1893A	PSI	npn,TDP,si	3	.017	200	140	500	90	.001	190	—	—	
	2N1506A	PSI	npn,TDP,si	3.5	.02	200	80	500	60	.005	190	10	1.3	
	2N482	IND	npn,AJ,ge	3.5	150	85	2.5	*14	200	50	3	—	12	US, TI
	TR-482	IND	npn,AJ,ge	3.5	150	85	2.5	14	200	20	3	—	12	
HF 6	PT1558	PSI	npn,TDP,si	4	.023	200	80	—	40	.005	210	10	1	Converter
	2N212	SY	npn,AJ,ge	4	150	85	2.5	*18	50	20	50	—	—	GI, TI
	2N385	SY	npn,AJ,ge	4	150	100	2.0	*25	—	—	35	—	4	KF, GI, AMP
	2N414A	SY	npn,AJ,ge	4	150	85	2.5	*15	200	—	20	—	—	
	2N1027	SSD	npn,AJ,si	**4	250	175	1.7	15	100	18	0.025	—	7	KF
	2N1058	SY	npn,AJ,ge	4	50	75	1	*18	—	15	50	—	—	Converter
	2N94A	SY	npn,AJ,ge	5	150	85	2.5	*20	50	19	50	—	—	
	2N292	GE	npn,AJ,ge	5	65	85	.9	15	20	6-44	5	—	—	
	2N388A	RCA	npn,ge	5	150	—	—	*40	200	30*	—	—	—	TI
	2N395	RA	npn,AJ,ge	5	150	85	—	25	—	40	2.0	—	12	TO-5 RF Switch, TI, RCA
HF 7	2N439	GT	npn,AJ,ge	5	100	85	1.67	*30	—	—	10	—	12	SY, TI
	2N439A	RA	npn,AJ,ge	5	150	85	2.5	*30	—	—	10	—	12	TI
	2N448	GE	npn,RG,ge	5	65	85	1.1	15	20	25	5	—	2.4	
	2N520A	GI	npn,AJ,ge	5	150	100	2	*25	—	100	1	12	14	IND, KF, TV
	2N634	GE	npn,AJ,ge	5	150	85	2.5	*20	—	—	5	—	12	TI
	2N483	IND	npn,FA,ge	5.5	150	85	—	*12	20	60	3.0	—	—	US, TI
	2N357	RCA	npn,AJ,ge	6	100	85	1.67	*20	—	—	5	—	12	GI, SY, TI
	2N377	GI	npn,AJ,ge	6	150	100	2.0	*25	—	—	5	—	12	TI
	2N446A	SY	npn,AJ,ge	6	150	100	2	*30	—	120	2	12	14	TI
	2N483	US	npn,AJ,ge	6	150	85	2.5	12	20	65	1.5	10	*12	



close matching



9 New Differential Amplifier Transistors feature close matching of characteristics: ΔV_{BE} as low as 5 mV maximum. ☐ Other features include: temperature tracking of V_{BE} — $\Delta (V_{BE1} - V_{BE2}) / \Delta T$ as low as $10 \mu V / ^\circ C$; extremely high beta — up to 50 min. at $1 \mu A$ matched to within 10%; and low noise typically 2db. Extremely low leakage — as low as 1nA max. at 30 volts. ☐ Because these devices eliminate common-mode signals and allow use of balanced inputs to minimize input drift, they find application in low drift DC amplifiers, operational amplifiers, telemetry, comparators and analog-digital converters. These new microelectronic devices have two closely matched low-level NPN silicon planar transistors, electrically isolated but thermally connected, in a single 6-lead TO-5 package. Production quantities are presently available. ☐ Sales Offices: Chicago, Illinois; Los Angeles, California; Oakland, New Jersey; Medford, Massachusetts; Sykesville, Maryland; Bethpage, L. I., New York. ☐ Write today for technical bulletin. SPERRY SEMICONDUCTOR, Norwalk, Connecticut.

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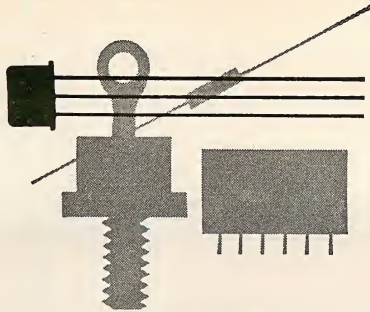
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SPERRY RAND
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ON READER-SERVICE CARD CIRCLE 444

HF continued

Cross Index Key	Type No.	Mfr.	Type	f _{ae} *f _T **f _{db} (mc)	MAX. RATINGS			CHARACTERISTICS					Remarks		
					P _c (mw)	T _i (°C)	V _{CEO} *V _{CBO} (v)	I _C (ma)	h _{fe} *h _{FE}	I _{CO} (μa)	NF (db)	C _{oe} *C _{ob} (pf)			
HF 8	OC45	AMP	pnp,PADT,ge	6	83	75	—	10	100	0.5	—	—	—	SY	
	2N139	RCA	pnp,AJ,ge	6.8	80	85	1	15	48	6	8	—	—	SY	
	2N218	RCA	pnp,AJ,ge	6.8	80	85	—	15	48	6	—	—	—	—	
	2N409	RCA	pnp,AJ,ge	6.8	80	85	—	13	15	48	10	—	—	—	
	2N410	RCA	pnp,AJ,ge	6.8	80	85	—	13	15	75	10	—	—	—	
	2N414	RA	pnp,FA,ge	7	150	85	—	*15	200	60	2.0	6	—	IND,US,TS,GE,RCA,AMP,TI	
HF 9	2N433	GI	pnp,AJ,ge	7	100	85	—	*20	400	45	3	—	9	TO-5 RF Switch, SY	
	2N1090	RA	pnp,AJ,ge	7	150	85	—	18	100	50	3	—	9	TO-5 RF Switch	
	CK14	RA	pnp,FA,ge	7	80	85	—	15	200	60	2.0	6	—	US	
	2N485	IND	pnp,AJ,ge	7.5	200	85	3	30	20	50	3	—	12	—	
	2N168A	GE	npn,RG,ge	8	65	85	1.1	15	20	40	5	—	2.4	—	
	2N169	GE	npn,RG,ge	8	65	85	1.1	15	20	72	5	—	2.4	—	
HF 10	2N293	GE	npn,RG,ge	8	65	85	1.1	15	20	25	5	—	2.4	—	
	2N388	GI	npn,AJ,ge	8	150	100	2.0	*25	—	—	—	—	12	SY, TI	
	2N396	RA	pnp,AJ,ge	8	150	85	—	20	—	60	2.0	—	12	TI	
	2N449	GE	npn,RG,ge	8	65	85	1.1	15	20	72	5	—	2.4	—	
	2N471A	TR	npn,GJ,si	8	200	200	30	25	10-25	.02	22	7	7	TI	
	2N472A	TR	npn,GJ,si	8	200	200	45	25	10-25	.02	22	7	7	TI	
HF 11	2N581	RA	pnp,AJ,ge	8	100	85	—	15	100	30	3	—	12	TO-5 RF Switch, RCA	
	2N597	PSI	npn,TDP,si	.8	.006	150	40	*45	.01	250	—	—	—	—	
	2N1086	GE	npn,RG,ge	8	65	85	1.1	9	20	40	3	—	2.4	—	
	2N1086A	GE	npn,RG,ge	8	65	85	1.1	9	20	40	3	—	2.4	—	
	2N1087	GE	npn,RG,ge	8	65	85	1.1	15	20	72	5	—	2.4	—	
	2N1171	GI	pnp,fe	8	150	100	2	*1	100	70	5	—	15	—	
HF 12	2N1478	GI	npn,ge	8	150	100	2	*0.5	30	120	5	—	20	—	
	2N1624	GI	npn,ge	8	150	100	2	*0.25	10	100	5	—	20	—	
	2N2085	GI	npn,AJ,ge	9	100	85	1.67	*20	—	—	—	—	12	SY, TI	
	2N358	GI	pnp,AJ,ge	9	150	100	2	*25	—	150	1	12	14	—	
	2N521A	GI	pnp,AJ,ge	9	150	100	2	*25	—	150	1	12	14	—	
	2N140	RCA	pnp,AJ,ge	10	80	85	—	16	15	75	6	8	—	—	
HF 13	2N219	RCA	pnp,AJ,ge	10	80	85	—	16	15	75	6	—	—	—	
	2N411	RCA	pnp,AJ,ge	10	80	85	—	13	15	75	10	—	—	—	
	2N414B	IND	pnp,AJ,ge	10	200	85	2.5	14	200	90	3	—	12	IND, KF	
	2N416	RA	pnp,FA,ge	10	150	85	—	*12	200	80	2.0	4	—	IND, US, GI, TS, KF, AMP	
	2N440	GI	npn,AJ,ge	10	100	85	1.67	*30	—	—	10	—	12	SY, TI	
	2N400A	GI	npn,AJ,ge	10	150	85	2.5	*30	—	—	10	—	12	RA, TI	
HF 14	2N447A	GI	npn,AJ,ge	10	150	100	2	*30	—	—	150	2	12	14	—
	2N477A	TR	npn,GR,si	10	150	150	1.0	*15	25	20-50	.02	20	7	—	—
	ST905	TR	npn,GR,si	10	200	200	—	*15	25	20-50	.02	20	7	—	—
	2N473	TR	npn,GR,si	10	200	200	—	*30	25	20-50	.02	20	7	—	—
	2N474	TR	npn,GR,si	10	200	200	—	*30	25	30-200	.01	19	7	AMP	—
	2N474A	TR	npn,GJ,si	10	200	200	—	30	25	20-50	.02	20	7	—	—
HF 15	2N475	TR	npn,GR,si	10	200	200	—	*45	25	20-50	.02	20	7	—	—
	2N484	US	pnp,FA,ge	10	150	85	—	*12	20	90	3.0	—	7	—	—
	2N2425	KF	npn,AJ,si	10	375	200	—	50	50	60	0.1	10	7	JAN, TI	—
	2N118A	TR	npn,GR,si	11	150	175	—	*30	25	19-90	0.1	27	7	—	—
	2N478	TR	npn,GR,si	11	200	200	—	*15	25	40-100	0.2	20	7	—	—
	2N479	TR	npn,GR,si	11	200	200	—	30	25	40-100	.02	20	7	—	—
HF 16	2N479A	TR	npn,GJ,si	11	200	200	—	30	25	40-100	.02	20	7	—	—
	2N480	TR	npn,GR,si	11	200	200	—	45	25	40-100	.02	20	7	—	—
	2N480	TR	npn,GR,si	11	200	200	—	45	25	40-100	.02	20	7	—	—
	2N1417	TR	npn,GR,si	11	150	150	—	*15	25	30-200	0.1	19	7	AMP	—
	2N1418	TR	npn,GR,si	11	150	150	—	30	25	30-200	0.1	19	7	NA	—
	ST115	TR	npn,GR,si	11	200	200	—	15	25	10-100	.02	22	7	2N332	—
HF 17	ST345	TR	npn,GR,si	11	200	200	—	30	25	10-100	.02	22	7	—	—
	ST455	TR	npn,GR,si	11	200	200	—	45	25	10-100	.02	22	7	—	—
	ST904A	TR	npn,GR,si	11	150	150	1.0	30	—	60	0.1	25	7	—	—
	ST910	TR	npn,GR,si	11	150	150	1.0	*30	—	140	0.1	20	7	TO-5, RF Switch, KF, TI, RCA	—
	2N397	RA	pnp,AJ,ge	12	150	85	3	30	20	100	3	—	12	RA, US	—
	2N486	IND	pnp,AJ,ge	12	150	85	—	30	20	100	3	—	12	—	—
HF 18	2N751	GE	npn,DJ,si	12	150	175	0.75	50	4	0.01	—	20	*20	—	—
	4C28	GE	npn,GD,si	12	150	125	—	*40	25	30	2	20	*20	—	—
	4C29	GE	npn,GD,si	12	150	125	—	*40	25	30	2	20	*20	—	—
	4C30	GE	npn,GD,si	12	150	125	—	*40	25	30	2	20	*20	—	—
	2N541	TR	npn,GR,si	15	200	200	—	*15	25	80-200	0.2	20	7	NA, TI	—
	2N542	TR	npn,GR,si	15	200	200	—	*30	25	80-200	0.2	20	7	NA, TI	—
HF 19	2N542A	TR	npn,GJ,si	15	200	200	—	30	25	80-200	0.2	20	7	NA, TI	—
	2N543	TR	npn,GR,si	15	200	200	—	*45	25	80-200	0.2	20	7	—	—
	2N602A	GI	pnp,DR,ft	15	120	85	2	*30	50	50	5	25	7	TO-5 RF switch	—
	2N1091	RA	npn,AJ,ge	15	150	85	—	15	100	70	3	—	9	—	—
	2N2424	KF	pnp,AJ,si	15	375	200	—	40	50	80	0.1	—	7	—	—
	2N2424	KF	pnp,AJ,si	15	375	200	—	40	50	80	0.1	—	7	—	—

HUGHES SEMICONDUCTOR BUYERS' GUIDE



HUGHES® DIODES

Silicon MICROSEAL* Diodes — Zener and Computer Types With or without welded leads, or in circuit arrays (0.062" dia. x 0.030" thick). Rated 150 mW free air (minimum), 500 mW mounted in circuit boards, to 1 watt infinite heat sink. Microminiature devices for high density circuit applications. Representative Types are E.I.A. equivalents: 1N46-59, 1N625-27, 1N903-08, 1N914, 1N916, 1N1934-37, 1N3064 and 1N3067.

Silicon Zener Diodes Power Dissipation up to 500 mW. Hard backs with extremely low noise and dynamic impedance. Stable alloy process. Excellent voltage regulation as low as $\pm 3\%$ at low current level. Representative Types: 1N702-726A, 1N746-759A, 1N957-975B, 1N761-769, 1N1929-1937.

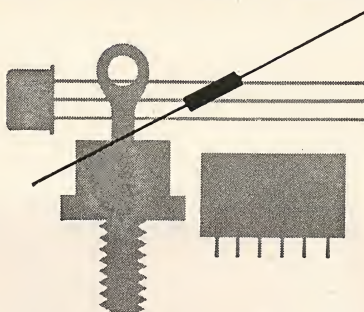
Silicon Capacitor Diodes Medium Q devices with good stability and low leakage. Capacitance ranges from 20 to 100 pf (tolerance as low as $\pm 5\%$) with maximum bias voltage variations up to 150 volts. Representative Types: 1N950-956.

Silicon Computer Diodes Diffused planar passivated. Inverse working voltages to 100 volts. Recovery times as low as 2 nsec using a sampling scope circuit. Representative Types: 1N903-08, 1N914, 1N916, 1N3064 and 1N3067.

Germanium Point Contact Diodes The first industry standard subminiature glass general purpose and computer diode. Proven stability with inverse working voltages to 190 volts. Recovery times as low as 0.75 nsec using a sampling scope. Representative Types: 1N198B, 1N933, HPS, 1600 series.

Germanium Gold Bonded Diodes General purpose and computer applications. Recovery times as low as 3.5 nsec. Improved rugged mechanical stability withstands 30,000 G's centrifuge and 3,000 G's shock. Representative Types: 1N270, 1N276, 1N277 and HD1800 series.

Silicon General Purpose Alloy Diodes and Rectifiers Power Dissipation to 250 mW. Forward currents to 0.2 amps. Oxide-coated (surface passivated) units with working inverse voltages up to 1,000 volts. Representative Types: 1N456-459, 1N482B-488B, 1N846-889.

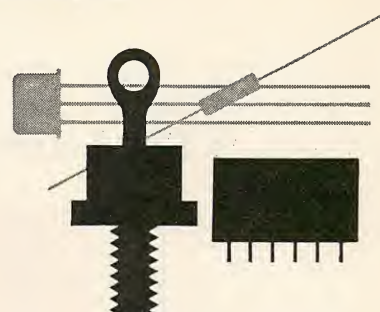


HUGHES TRANSISTORS

PNP Silicon Alloy Junction Transistors 2N1034, 2N1035, 2N1036, 2N1037, 2N1228 through 2N1234, 2N1238 through 2N1244, 2N327A, 2N328A, (also USA 2N328A), 2N329A, HA7597, HA7598, HA7599, HA7520 through HA7529, HA7530, through HA7539... available in the standard TO-5 package or the Hughes coaxial package with up to 5 watts power dissipation. Manufactured by the evaporative-fusion technique which creates unusually low saturation resistance. Retain highly uniform characteristics from batch to batch, making possible much closer tolerances in the design of small-signal, high-temperature and amplifier circuits.

PNP Silicon Double Diffused Planar Transistors 2N1254, 2N1255, 2N1256, 2N1257, 2N1258, 2N1259, HA9048, HA9049, 2N1196, 2N1197, (also USA 2N1197), 2N869, 2N995... most types available in any package configuration... TO-5, TO-18, TO-46, the Hughes MICROSEAL transistor... or any industry standard package. Offer many outstanding features: low collector capacitance, good low- and high-level gain characteristics, low leakage currents, low stored base charge, typical f_t of 75 mc. High breakdown voltages in combination with gains, plus exceptionally fast-switching capabilities, make these superior general purpose units. 2N1131, 2N1131A, 2N1132, 2N1132A, 2N1132B, 2N1991... available in any package configuration... TO-5, TO-18, TO-46, the Hughes MICROSEAL transistor... or any industry standard package. Used extensively in advanced missile, satellite and computer applications. Feature high breakdown voltages, exceptionally low leakage currents, typically 20 nanoamps, measured at stringent bias conditions. Most types offer guaranteed switching times of less than 50 nanoseconds.

NPN Silicon Double Diffused Planar Transistors 2N706, 2N706A, 2N706B, 2N707, 2N726, 2N753 Planar, 2N1613, 2N708 Planar, 2N743, 2N744 Epitaxial, 2N913, 2N914 Planar Epitaxial... available in any package configuration... TO-5, TO-18, TO-46, the Hughes MICROSEAL transistor... or any industry standard package.



HUGHES RECTIFIERS

Miniature High-Power Rectifiers These 1 amp devices are available from 50 to 3,000 volts PIV in the DO-7 package.

Standard Metal Package Rectifiers Available at ratings of 6, 12, 20 and 35 amps. PIV ratings are from 50 to 1,000 volts for the 6 and 12 amp packages. (DO-4 and DO-10), and from 50 to 600 volts in the 20 and 35 amp packages (DO-5 and DO-11).

Fast-Switch Rectifiers Hughes' new HF series (1 to 30 amp) "Golden Line" rectifiers have recovery times of less than 200 nanoseconds. Typical room temperature reverse leakage currents at rated PIV of 15 to 80 μ amps for 1 to 30 amp devices, respectively. Maximum forward voltage drop of less than 1.4 volts at rated current.

Stacked Rectifiers and Assemblies Custom designed stacked rectifiers are available up to 60 kv with currents up to 20 amp. These designs make use of the R-C compensation to assure long life and high reliability.

Bridge assemblies for 3-phase and single-phase designs and potted configurations available—minimum deliveries and costs.

HUGHES PACKAGED ASSEMBLIES **Packaged Assemblies** Standard and custom assemblies encapsulated in epoxy. These offer impressive savings in time, money and space.

Typical assemblies include: single-phase and 3-phase bridges, voltage doublers and quadruplers, ring modulators, matched pairs, matched quads, phase detectors, computer modules, cartridge rectifiers or any custom units.

For more details on any of these products contact your nearest Hughes representative. Or write: Hughes Semiconductor Division Marketing Department, Newport Beach, California.

DIODES • TRANSISTORS • RECTIFIERS
PACKAGED ASSEMBLIES • CRYSTAL FILTERS

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HUGHES AIRCRAFT COMPANY
SEMICONDUCTOR DIVISION



HF *continued*

Cross Index Key	Type No.	Mfr.	Type	f_{ae} $^{*}f_T$ $^{**}f_{ab}$ (mc)	MAX. RATINGS					CHARACTERISTICS					Remarks
					P _i (m v)	T _i (°C)	P _o mw/°C	V _{CEO} $^{*}V_{CBO}$ (v)	I _C (ma)	h _{FE} $^{*}h_{FE}$	I _{CO} (μa)	NF (db)	C _{oe} $^{*}C_{ob}$ (pf)		
HF 15	OC44	AMP	pnnp,PADT,ge	15	83	75	—	*15	10	100	0.5	—	—	TI TI TI KF, TI TO-5 RF switch, TI SPR, KF, MIL SPR SPR IND, US, GI, TS, KF, TI	
	2N388A	TI	npn,AJ,ge	**16	150	—	—	40	200	*60-180	5	—	20*		
	2N476	TR	npn,GJ,si	17	200	200	—	*15	25	30-60	.02	19	8		
	2N477	TR	npn,GJ,si	17	200	200	—	*30	25	30-60	.02	19	8		
	2N522A	GI	pnnp,AJ,ge	17	150	100	2	*25	—	200	1	12	14		
	2N582	RA	pnnp,AJ,ge	18	100	85	—	*14	100	60	3	—	12		
	2N1118	PH	pnnp,SAT,si	18	150	140	1.3	*25	50	20	—	—	*6		
	2N1118A	PH	pnnp,SAT,si	18	150	140	1.3	*25	50	25	—	—	*6		
HF 16	2N232	PH	pnnp,SBT,ge	20	9	55	0.9	*4.5	4.5	39	6	—	*6	hi freq., hi pwr. Hi frequency,	
	2N417	RA	pnnp,FA,ge	20	150	85	—	*10	200	140	2.0	4	—		
	2N602	GI	pnnp,Dr,ge	20	120	85	2	*20	—	—	3	14	4		
	2N1899	PSI	npn,DM,si	20	125 N	150	1000	140	10a	10	20ma	—	600		
	2N1902	PSI	npn,DM,si	20	125	150	1	140	10a	10	20	—	—		
	2N1903	PSI	npn,DM,si	20	125	150	1	140	10a	10	20	—	—		
	2N1904	PSI	npn,DM,si	20	125	150	1	140	10a	10	20	—	—		
	2N1907	TI	pnnp,AD,ge	*20	150 N	—	—	100	20a	*10	0.3ma	—	—		
HF 17	2N1908	TI	pnnp,AD,ge	*20	150 N	—	—	130	20a	*10	0.3ma	—	—	MIL IND, KF SPR, chopper hi freq., hi pwr. hi freq., hi pwr. SY	
	2N2551	HU	pnnp,A,si	*20	400	160	3.0	.150	.1	*90	6	*1.0	200		
	PT900	PSI	npn,DM,si	20	125 N	150	1000	80	10a	3	40	—	600		
	PT901	PSI	npn,Ms,si	20	125 N	150	1000	140	10a	10	30	—	600		
	2N495	PH	pnnp,SA,si	21	150	140	1.3	*25	50	30	.002	—	*6		
	2N523A	GI	pnnp,AJ,ge	23	150	100	2	*20	—	300	1	12	14		
	2N1428	PH	pnnp,SAT,si	23	100	140	0.86	*6	50	45	.001	—	*7		
	2N1429	PH	pnnp,SAT,si	23	100	140	0.86	*6	50	45	.001	—	*7		
HF 18	2N1677	PH	pnnp,SAT,si	23	100	140	0.87	*4.5	50	50	.001	—	*7	AMP AMP Hi freq., hi pwr. Hi freq., hi pwr.	
	2N1065	GI	pnnp,Dr,ge	25	120	85	2	*40	—	—	4	12	3		
	2N1900	PSI	npn,DM,si	25	125 N	150	1000	140	5a	10	20ma	—	600		
	2N1901	PSI	npn,DM,si	25	125 N	150	1000	140	a	15	20ma	—	600		
	2N274	RCA	pnnp,Dr,ge	30	120	85	—	*40	10	60	16	—	—		
	2N370	RCA	pnnp,Dr,ge	30	24	85	—	*40	10	60	20	—	—		
	2N371	RCA	pnnp,Dr,ge	30	80	85	—	20	10	—	20	—	—		
	2N372	RCA	pnnp,Dr,ge	30	80	85	—	20	10	60	20	—	—		
HF 19	2N373	RCA	pnnp,Dr,ge	30	80	85	—	25	10	60	8	—	—	SY Mixer, SY SY converter, SY GI, AMP, SY	
	2N374	RCA	pnnp,Dr,ge	30	80	85	—	25	10	60	8	—	—		
	2N1224	RCA	pnnp,Dr,ge	30	120	85	—	*40	10	60	12	—	—		
	2N1226	RCA	pnnp,Dr,ge	30	120	85	—	*60	10	60	16	—	—		
	2N1395	RCA	pnnp,Dr,ge	30	120	85	—	*40	10	90	16	—	—		
	2N1709	PSI	npn,DM,si	30	130	175	86.7	75	1.2a	—	—	—	40		
	2N1710	PSI	npn,DM,si	30	130	175	86.7	60	1.2a	—	50	±	40		
	2N1750	PH	pnnp,SBT,ge	30	15	75	0.5	*14	5	*18	2	—	*6		
HF 20	2N2225	KF	pnnp,AJ,ge	30	220	100	—	15	500	300	—	3	10	GI GI GI GI	
	2N2595	SSD	pnnp,DP,si	*30	4.0	200	2.3	60	—	15-60	25na	—	*6		
	2N2598	SSD	pnnp,DP,si	*30	4.0	200	2.3	80	—	15-60	25na	—	6		
	MHT-6001	MH	npn,DP,si	30	40	175	270	*100	5a	10-120	1	—	—		
	2N1425	RCA	pnnp,Dr,ge	33	80	71	—	24	10	50	12	—	—		
	2N1426	RCA	pnnp,Dr,ge	33	80	71	—	24	10	130	12	—	—		
	2N1524	RCA	pnnp,Dr,ge	33	80	71	0.4	24	10	60	16	—	2		
	2N1525	RCA	pnnp,Dr,ge	33	80	71	0.4	24	10	60	16	—	2		
HF 21	2N1526	RCA	pnnp,Dr,ge	33	80	71	0.4	24	10	130	16	—	—	TMT839 (150mw) TMT840 (150mw)	
	2N1527	RCA	pnnp,Dr,ge	33	80	71	0.4	24	10	130	16	—	—		
	2N934	RCA	pnnp,ge	*35	150	—	—	13	200	*60	—	—	—		
	2N603	GI	pnnp,Dr,ge	40	120	85	2	*30	—	—	3	14	3		
	2N603A	GI	pnnp,DR,ft	40	120	85	2	*30	50	60	5	25	5		
	2N750	RA	npn,DJ,si	40	150	175	0.75	50	50	7	10	—	6		
	2N1633	RCA	pnnp,Dr,ge	40	80	71	0.4	34	10	75	16	—	—		
	2N1634	RCA	pnnp,Dr,ge	40	80	71	0.4	34	10	75	16	—	—		
HF 21	2N1638	RCA	pnnp,Dr,ge	40	80	71	0.4	34	10	75	7	—	2	GI GI GI GI	
	2N3746	RCA	pnnp,Dr,ge	40	80	71	—	34	20	.985	16	—	3.8		
	2N640	RCA	pnnp,Dr,ge	42	80	85	0.75	34	10	60	5	—	—		
	2N641	RCA	pnnp,Dr,ge	42	80	85	0.75	34	10	60	7	—	—		
	2N642	RCA	pnnp,Dr,ge	42	80	85	0.75	34	10	60	7	—	—		
	2N754	TR	npn,DJ,si	44	300	175	—	*60	50	20-80	1	—	8		
	2N755	TR	npn,DJ,si	44	300	175	—	*100	50	20-80	1	—	8		
	2N839	TR	npn,DJ,si	44	300	175	—	*45	25	20-45	0.1	15	—		
HF 21	2N840	TR	npn,DJ,si	44	300	175	—	*45	25	40-90	0.1	15	8	GI GI GI GI	
	TMT842	TR	npn,DJ,si	44	150	175	—	*45	25	20	0.1	—	6		
	2N1196	HU	pnnp,MS,si	45	305	200	2	70	—	—	—	—	4		
	2N1631	RCA	pnnp,Dr,ge	45	80	71	0.4	34	10	80	16	—	2		
	2N1632	RCA	pnnp,Dr,ge	45	80	71	0.4	34	10	80	16	—	2		
	2N1635	RCA	pnnp,Dr,ge	45	80	71	0.4	34	10	75	16	—	—		
	2N642	RCA	pnnp,Dr,ge	42	80	85	0.75	34	10	60	7	—	—		
	2N754	TR	npn,DJ,si	44	300	175	—	*60	50	20-80	1	—	8		
2N755	TR	npn,DJ,si	44	300	175	—	*100	50	20-80	1	—	8			
2N839	TR	npn,DJ,si	44	300	175	—	*45	25	20-45	0.1	15	—			
2N840	TR	npn,DJ,si	44	300	175	—	*45	25	40-90	0.1	15	8			
TMT842	TR	npn,DJ,si	44	150	175	—	*45	25	20	0.1	—	6			
2N1196	HU	pnnp,MS,si	45	305	200	2	70	—	—	—	—	4			
2N1631	RCA	pnnp,Dr,ge	45	80	71	0.4	34	10	80	16	—	2			
2N1632	RCA	pnnp,Dr,ge	45	80	71	0.4	34	10	80	16	—	2			
2N1635	RCA	pnnp,Dr,ge	45	80	71	0.4	34	10	75	16	—	—			

TEKTRONIX TRANSISTOR-CURVE TRACER

INVALUABLE TOOL FOR EVALUATING SEMICONDUCTOR DEVICES

With a Type 575, you can plot and measure 7 different transistor characteristics. You can display 4 to 12 curves per family—with input current from 1 microampere/step to 200 milliamperes/step or input voltage from 10 millivolts/step to 200 millivolts/step—in repetitive or single-family presentations. You can select either common-emitter or common-base configurations.

The Type 575 provides 20-ampere collector displays (10-ampere average supply current), two ranges of collector supply (0 to 20 volts, 0 to 200 volts), and 2.4-ampere base supply (positive or negative base stepping).

Add a Type 175 Adapter and you extend the range of collector displays 10 times and the range of base supply 5 times.

You can also test diodes under a wide variety of conditions and observe waveform characteristics on the 5-inch crt with a high degree of accuracy.

Type 575 Calibrated Displays

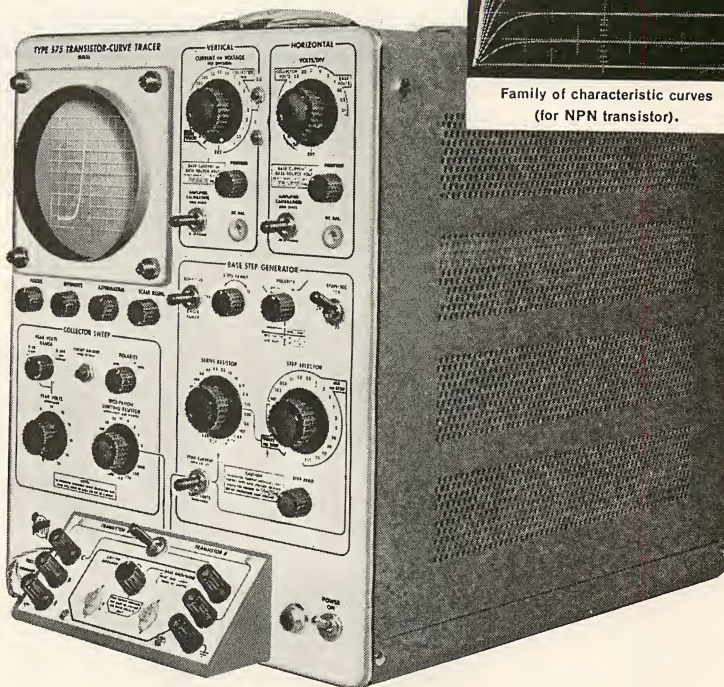
Vertical Axis—Collector Current, 16 steps from 0.01 ma/div to 1000 ma/div. Pushbuttons are provided for multiplying each current step by 2 and dividing by 10, increasing the current range to 0.001 ma/div to 2000 ma/div.

Horizontal Axis—Collector Voltage, 11 steps from 0.01 v/div to 20 v/div.

Both Axes—Base Voltage, 6 steps from 0.01 v/div to 0.5 v/div. Base Current, 17 steps from 0.001 ma/div to 200 ma/div. Base Source Voltage, 5 steps from 0.01 v/div to 0.2 v/div.

Type 575 Transistor-Curve Tracer \$1075

U.S. Sales Prices f.o.b. Beaverton, Oregon



HIGH-CURRENT ADAPTER

For measuring high-powered semiconductor devices which exceed the current capabilities of a Type 575, ask your Tektronix Field Engineer about the Type 175 High-Current Adapter. Not intended for separate use, the Type 175 depends upon the circuitry and crt of a Type 575 to provide 200-ampere collector displays, three ranges of collector supply, and 12-ampere base supply—for calibrated displays with Collector Current on the Vertical Axis and either Collector Voltage or Base Voltage on the Horizontal Axis.

Type 175 Transistor-Curve Tracer High-Current Adapter \$1475



HIGH-VOLTAGE TYPE 575

Supplied on order from your Tektronix Field Engineer is a special model of the Type 575 Transistor-Curve Tracer. Although similar to the Type 575, the special model provides much higher diode breakdown test voltage (variable from zero to 1500 volts at a maximum current of 1 milliamperes) and also much higher Collector Supply (up to 400 volts, at 0.5 ampere).

For complete specifications of this special model—call your Tektronix Field Engineer.

Type 575 Mod 122C \$1325

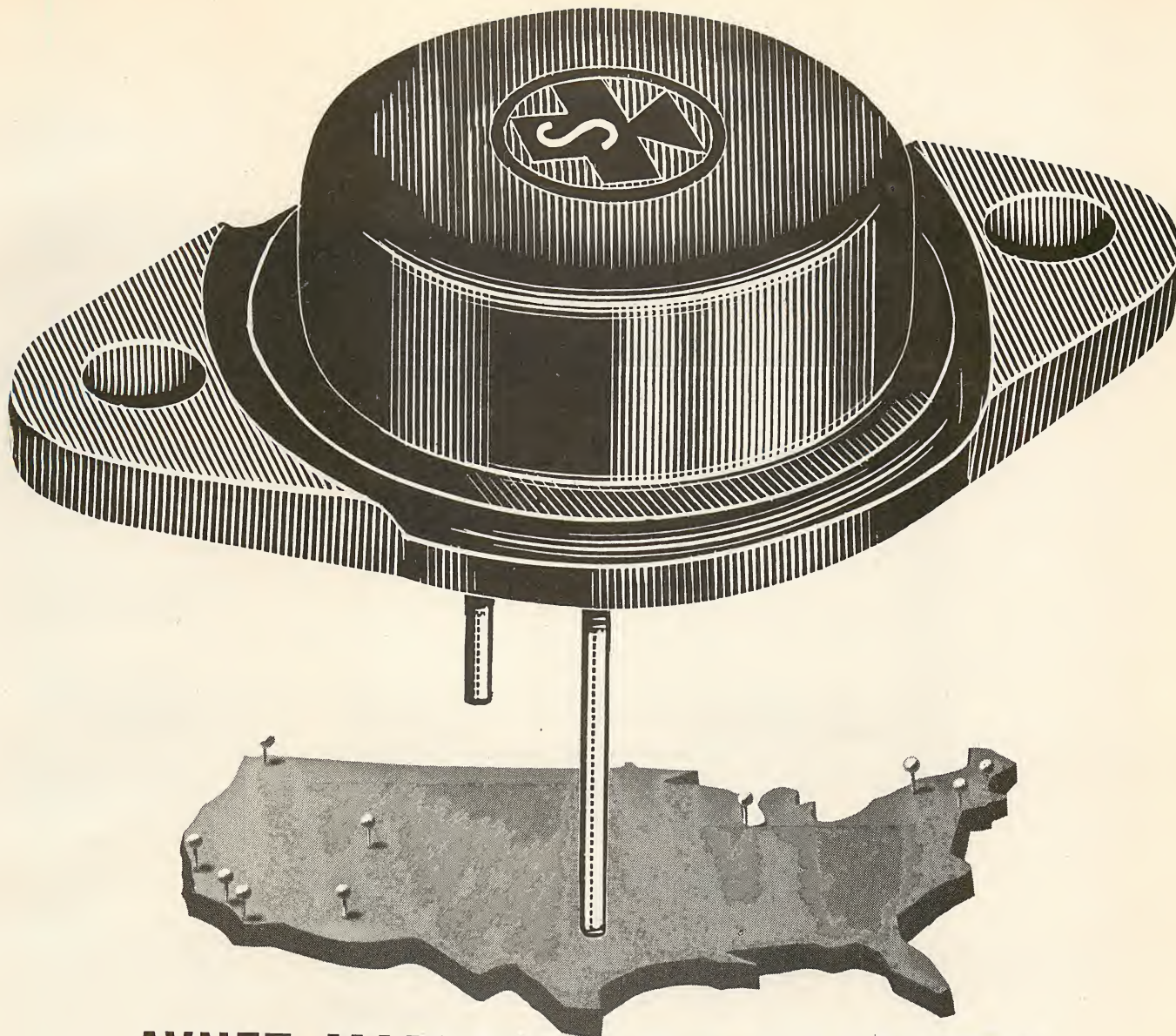
. . . for more information about evaluating semiconductor devices with a Type 575 or other Tektronix test equipment, please call your Tektronix Field Engineer. He will be glad to assist you.

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HF *continued*

Cross Index Key	Type No.	Mfr.	Type	f_{ce} * f_T ** f_{ab} (mc)	MAX. RATINGS				CHARACTERISTICS					Remarks
					P_c (mw)	T_j (°C)	$m_w/°C$	V_{CEO} * V_{CBO} (v)	I_C (ma)	h_{fe} * h_{FE}	I_{CO} (μ a)	NF (db)	C_{oe} * C_{ob} (pt)	
HF 22	2N1636	RCA	ppp,Di,ge	45	80	71	0.4	34	10	75	16	—	—	GI
	2N1637	RCA	ppp,Di,ge	45	80	71	0.4	34	10	80	5	—	2	GI
	2N1639	RCA	ppp,Di,ge	45	80	71	0.4	34	10	75	7	—	*3	GI
	2N344	PH	ppp,SB,ge	50	20	55	1.33	*5	5	22	0.7	—	*3	SPR
	2N345	PH	ppp,SA,ge	50	20	55	1.33	*5	5	35	0.7	—	*3	SPR
	2N393	PH	ppp,MA,ge	50	25	100	0.63	*6	50	155	5	—	*2	SPR,GI
	2N604	GI	ppp,Di,ge	50	120	85	2	*30	—	—	4	14	3	TI
	2N738	AI	npn,P,si	**50	1.0w	—	—	*125	—	*15	.01	—	*8.0	—
	2N739	AI	npn,P,si	**50	1.0w	—	—	*125	—	*30	.01	—	*8.0	—
	2N740	AI	npn,P,si	**50	1.0w	—	—	*125	—	*60	1.0	—	*8.0	—
HF 23	2N759	GE	npn,si	**50	500	200	—	45	—	36	0.2	—	8	Planar Passivated
	2N760	GE	npn,si	**50	500	200	—	45	—	76	0.2	—	8	Planar Passivated
	2N760A	AI	npn,P,si	**50	1.50w	—	—	*60	—	*205	0.01	—	*8.0	—
	2N870	AI	npn,P,si	**50	1.8w	—	—	*100	—	*200	.01	—	*8.0	—
	2N871	AI	npn,P,si	**50	1.8w	—	—	*100	—	*200	0.01	—	*8	—
	2N910	AI	npn,P,si	**50	1.8w	—	—	*100	—	*75	2.05	—	*8.0	—
	2N911	AI	npn,P,si	**50	1.8w	—	—	*100	—	*35	2.05	—	*8.0	—
	2N912	AI	npn,P,si	**50	1.8w	—	—	*100	—	*15	2.05	—	*8.0	—
	2N956	AI	npn,P,si	**50	1.8w	—	—	*75	—	*200	0.01	—	*8	—
	2N998	AI	npn,P,si	**50	1.8w	—	—	*100	—	*5000	.01	—	*8.0	—
HF 24	2N1564	AI	npn,P,si	**50	1.2v	—	—	*80	—	*15	1.0	—	*8.0	—
	2N1565	AI	npn,P,si	**50	1.2v	—	—	*80	—	*30	.01	—	*8.0	—
	2N1566	AI	npn,P,si	**50	1.2v	—	—	*125	—	*60	.01	—	*8.0	—
	2N1572	AI	npn,P,si	**50	1.2v	—	—	*125	—	*15	1.0	—	*8.0	—
	2N1573	AI	npn,P,si	**50	1.2v	—	—	*125	—	*30	1.0	—	*8.0	—
	2N1574	AI	npn,P,si	**50	1.2v	—	—	*125	—	*60	1.0	—	*8.0	—
	2N1889	AI	npn,P,si	**50	3.0v	—	—	*100	—	*200	0.01	—	*8	—
	2N1890	AI	npn,P,si	**50	3.0v	—	—	*100	—	*200	0.01	—	*8	—
	2N1972	AI	npn,P,si	**50	3.0v	—	—	—	—	—	—	—	*8.0	—
	2N1973	AI	npn,P,si	**50	3.0v	—	—	*100	—	*75	2.5	—	*8	—
HF 25	2N1974	AI	npn,P,si	**50	3.0v	—	—	*100	—	*35	2.5	—	*8	—
	2N1975	AI	npn,P,si	**50	3.0v	—	—	*100	—	*15	2.05	—	*8.0	—
	2N1983	AI	npn,P,si	**50	2.0v	—	—	*50	—	2.0	5.0	—	*8.0	—
	2N1984	AI	npn,P,si	**50	2.0v	—	—	*50	—	2.0	5.0	—	*8.0	—
	2N1985	AI	npn,P,si	**50	2.0v	—	—	*50	—	*85	5.0	—	*8.0	—
	2N1986	AI	npn,P,si	**50	2.0v	—	—	*50	—	*130	5.0	—	*8.0	—
	2N1987	AI	npn,P,si	**50	2.0v	—	—	*50	—	*60	5.0	—	*8.0	—
	2N1988	AI	npn,P,si	**50	2.0v	—	—	*100	—	*85	5.0	—	*8.0	—
	2N1989	AI	npn,P,si	**50	2.0v	—	—	*100	—	*40	5.0	—	*8.0	—
	2N1990	AI	npn,P,si	**50	2.0v	—	—	*100	—	*20	—	—	*8.0	—
HF 26	2N2060	AI	npn,P,si	**50	1.5w	—	—	*100	—	*50	—	—	*8.0	—
	2N2223	AI	npn,P,si	**50	1.6v	—	—	*100	—	*150	.01	—	*8.0	—
	2N2223A	AI	npn,P,si	**50	1.6v	—	—	*100	—	*150	.01	—	*8.0	—
	2N2453	AI	npn,P,si	**50	0.6w	—	—	*60	—	*80	.005	—	*8.0	—
	2N2483	AI	npn,P,si	**50	1.2v	—	—	*60	—	—	.01	—	*8.0	—
	2N2484	AI	npn,P,si	**50	1.2v	—	—	*60	—	*30	.01	—	*8.0	—
	2N2590	SSD	ppp,DP,si	*50	4.0	200	2.3	60	—	30-80	2.3ma	—	*5	—
	3N36	GE	npn,MB,ge	50	30	85	0.5	6	20	2.2	3	—	2	tetrode
	ASA-2	AI	npn,P,si	**50	75v	—	—	*60	—	*45	.01	—	*8.0	—
	ASA-31	AI	npn,P,si	**50	—	—	—	—	—	—	—	—	*8.0	—
HF 27	ASA-51	AI	npn,P,si	**50	—	—	—	—	—	—	—	—	*8.0	—
	ASA-100	AI	npn,P,si	**50	—	—	—	—	—	—	—	—	*8.0	—
	ASA-1000	AI	npn,P,si	**50	—	—	—	—	—	—	—	—	*8.0	—
	ASA-1003	AI	npn,P,si	**50	—	—	—	—	—	—	—	—	*8.0	—
	ASA-1004	AI	npn,P,si	**50	—	—	—	—	—	—	—	—	*8.0	—
	2N1197	HU	ppp,MS,si	55	38v	200	2	70	—	—	—	—	4	—
	2N604A	GI	ppp,DR,ft	60	12v	85	2	*30	50	70	5	25	5	—
	TR3100	IND	npn,DM,si	*60	50v-25C	300	4	*150	500	*30	0.01	—	10	—
	TR3101	IND	npn,DM,si	*60	50v-25C	300	4	*180	500	*25	0.01	—	15	—
	TR3301	IND	npn,DM,si	*50	50v-25C	300	4	*300	500	*30	0.01	—	25	—
HF 28	2N128	PH	ppp,SB,ge	60	25	85	0.82	*10	5	40	0.6	10	*2.5	SPR-MIL
	2N841	TR	npn,DJ,si	64	30v	175	—	45	25	80-330	0.1	15	8	TMT841 (150 mw)
	TMT843	TR	npn,DJ,si	64	15v	175	—	45	25	40	0.1	6	6	—
	2N929	AI	npn,P,si	**70	0.1w	—	—	*45	—	*200	.01	—	*8.0	—
	2N930	AI	npn,P,si	**70	0.1w	—	—	*45	—	*200	.01	—	*8.0	—
	2N990	AMP	ppp,PADT,ge	70	67	75	1.33	20	10	75	—	—	—	RF, Mixer, Oscillator
	2N991	AMP	ppp,PADT,ge	70	67	75	1.33	*20	10	75	—	—	—	RF, Mixer, Oscillator
	2N992	AMP	ppp,PADT,ge	70	67	75	1.33	*20	10	75	—	—	—	RF, Mixer, Oscillator
	2N1335	PSI	npn,MS,si	70	2.1w	150	24	120	75	13	8	—	4	High freq., high power
	2N1336	PSI	npn,MS,si	70	2.1w	150	24	120	75	13	8	—	4	High freq., high power



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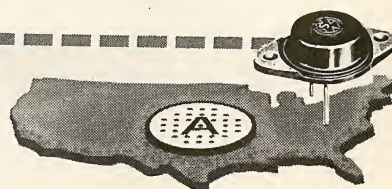
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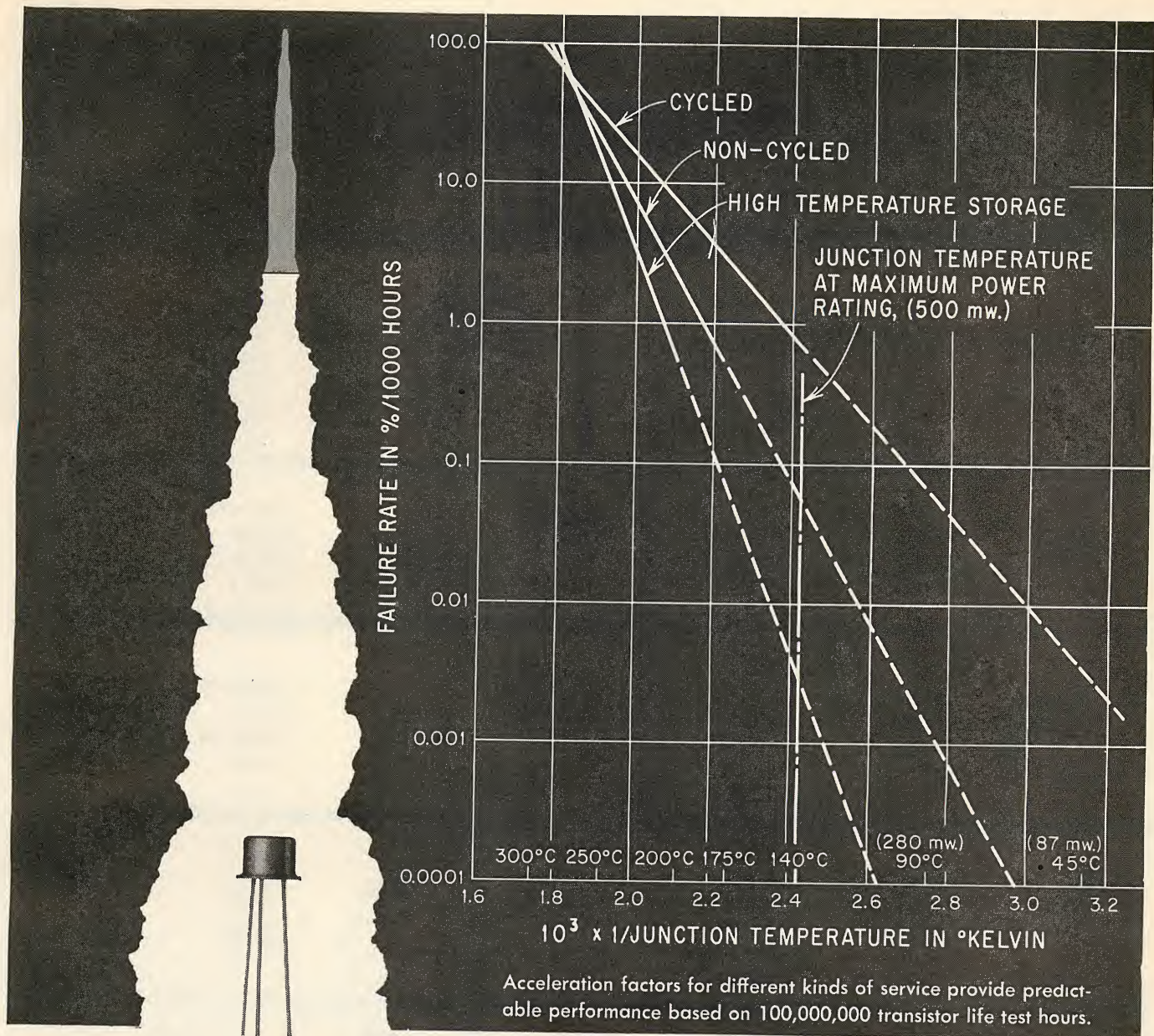
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HF continued

Cross Index Key	Type No.	Mfr.	Type	f _{ae} *f _T +f _{db} (mc)	MAX. RATINGS			CHARACTERISTICS					
					T _i (°C)	mW/°C	V _{CEO} *V _{CBO} (v)	I _C (ma)	h _{FE} *h _{FE}	I _{CO} (μa)	NF (db)	C _{oe} *C _{ob} (pf)	Remarks
HF 29	2N1337	PSI	npn,MS,si	70	150	24	120	75	13	8	—	4	High freq., high power
	2N1339	PSI	npn,MS,si	70	150	24	120	75	—	8	—	4	High freq., high power
	2N1340	PSI	npn,MS,si	70	150	24	120	75	—	8	—	4	High freq., high power
	2N1341	PSI	npn,MS,si	70	150	24	120	75	—	8	—	4	High freq., high power
	2N1505	PSI	npn,MS,si	70	175	0.2	50	—	7	—	—	20	High freq., high power
	2N1506	PSI	npn,MS,si	70	175	.2	60	9	—	—	—	8	High freq., high power
HF 30	2N1516	AMP	ppp,PAOT,ge	*70	—	1.7	*20	10	100	—	—	—	RF-IF
	2N1517A	AMP	ppp,PAOT,ge	*70	—	1.7	*40	10	150	—	—	*8.0	—
	2N2509	AI	npn,P,si	**70	—	—	*125	—	—	.001	—	*8.0	—
	2N2510	AI	npn,P,si	**70	—	—	*100	—	—	.005	—	*8.0	—
	2N2591	SSD	ppp,DP,si	*70	200	2.3	60	—	50-135	25na	—	*5	SPR
	2N346	PH	ppp,SB,ge	75	55	1.3	*5	5	35	0.7	—	*3	RF, Mixer, Osc., IF AM rec.
HF 31	2N393	AMP	ppp,PAOT,ge	75	75	1.7	*20	10	75	—	—	—	—
	2N2671	AMP	ppp,AD,ge	75	100	0.6	*32	10	150	—	—	—	—
	2N2672	AMP	ppp,AD,ge	75	100	0.6	*32	10	15	1.2	1.5	—	—
	2N2089	AMP	ppp,PAOT,ge	75	85	0.6	*32	10	150	—	—	—	RF Mixer, Osc., IF AM rec.
	2N2090	AMP	ppp,PAOT,ge	75	75	.75	*32	10	150	—	—	—	RF Mixer, Osc., IF AM rec.
	2N2091	AMP	ppp,PAOT,ge	75	83	1.7	*20	10	150	—	—	—	RF Mixer, Osc., IF AM rec.
HF 32	2N2092	AMP	ppp,PAOT,ge	75	100	0.6	*32	10	150	—	—	—	IF, Mixer FM rec.
	2N2093	AMP	ppp,PAOT,ge	75	100	1.7	*25	10	150	—	—	—	RF in FM rec.
	2N696	FA	npn,DP,si	80	175	13.3	40	—	40	0.1	—	18	RA,MO,PSI,TR,TI,IND,SY,GI,US
	2N698	FA	npn,DP,si	80	175	13.3	*80	—	30	0.1	—	12	RA,IND,TR,NA,GI,TI,PSI
	2N699	FA	npn,DP,si	80	175	13.3	80	—	65	.01	—	12	RA,NA,MH,GI,TI,US,PSI
	2N706	FA	npn,DP,si	80	175	6.7	25	—	12	.005	—	5	RA,NA,CL,GI,TI,TR,GE,MO
HF 33	2N1252	FA	npn,DP,si	80	2w	175	13.3	20	35	0.1	—	30	RA,TR, TI
	2N2511	AI	npn,P,si	**80	—	—	*80	—	*80	.005	—	*8.0	—
	2N2596	SSD	ppp,DP,si	*80	200	2.3	60	—	40-100	25na	—	*6	—
	2N2597	SSD	ppp,DP,si	*80	200	2.3	60	—	80-200	25na	—	*6	—
	2N2599	SSD	ppp,DP,si	*80	200	2.3	80	—	40-100	25na	—	*6	—
	2N2600	SSD	ppp,DP,si	*80	200	2.3	80	—	80-200	25na	—	*6	—
HF 34	MHT-4401	MH	npn,EP,si	80	200	23	*60	500	20-120	1	—	30	—
	MHT-4402	MH	npn,EP,si	80	200	23	*120	500	20-120	2	—	20	—
	MHT-4501	MH	npn,EP,si	80	200	57	*60	1a	20-120	1	—	25	—
	MHT-4502	MH	npn,EP,si	80	200	57	*120	1a	20-120	2	—	29	—
	2N844	TR	npn,DJ,si	86	300	175	*60	50	40-120	1	—	8	—
	2N845	SSD	ppp,DP,si	*90	4.0	200	2.3	60	40-120	1	—	8	—
HF 35	3N37	GE	npn,MB,ge	90	30	85	0.5	20	100-200	25na	3	*5	tetode
	2N384	RCA	ppp,Dr,ge	100	80	85	—	10	1.1	16	—	1.5	—
	2N697	FA	npn,DP,si	100	2w	175	13.3	40	60	3	—	—	—
	2N702	GI	npn,si	100	360	175	*5	10	0.01	—	18	—	RA,PSI,TR,US,MO,SY,NA,GI,TI
	2N703	GI	npn,si	100	360	175	*5	10	40	0.05	—	—	CL
	2N735A	SSD	npn,DP,si	*100	4.0	200	60	—	70	0.5	—	*6	CL
HF 36	2N736B	SSD	npn,DP,si	*100	4.0	200	60	—	40-100	5na	—	*6	—
	2N739A	SSD	npn,DP,si	*100	4.0	200	80	—	80-200	5na	—	*6	—
	2N740A	SSD	npn,DP,si	*100	4.0	200	80	—	40-100	5na	—	*6	—
	2N758B	SSD	npn,DP,si	*100	4.0	200	60	—	80-200	5na	—	*6	—
	2N759B	SSD	npn,DP,si	*100	4.0	200	60	—	18-90	5na	—	*6	—
	2N760B	SSQ	npn,DP,si	*100	4.0	200	60	—	36-90	5na	—	*6	—
HF 37	2N920	GI	npn,DM,si	100	1.2w	200	25	220	75-333	5na	—	*6	(CL, Epitaxial)
	2N921	GI	npn,DM,si	100	1.2w	200	50	200	4	.005	—	5	(CL, Epitaxial)
	2N922	GI	npn,DM,si	100	1.2w	200	50	200	4	.005	—	4	(CL, Epitaxial)
	2N929A	SSD	npn,DP,si	*100	4.0	200	45	—	60-350	2na	4	*6	(CL, Epitaxial)
	2N930A	SSD	npn,DP,si	*100	4.0	200	45	—	150-600	2na	3	*6	(CL, Epitaxial)
	2N979	SPR	ppp,MD,ge	*100	60	100	*20	100	50*	18	—	*2.5	—
HF 38	2N980	SPR	ppp,MD,ge	*100	60	100	*12	100	*70	1	—	*1.5	RF, Mixer, Osc.
	2N987	AMP	ppp,PAOT,ge	100	86	90	*40	10	100	1	—	—	—
	2N1180	RCA	ppp,Dr,ge	100	80	71	30	10	80	12	—	—	—
	2N1224	GI	DR,ft	100	120	85	*12	1.5	60	5	—	5	—
	2N1226	GI	DR,ft	100	120	85	*12	1.5	60	5	—	5	—
	2N1225	RCA	ppp,Dr,ge	100	120	85	*40	10	60	12	—	—	—
HF 39	2N1253	FA	npn,DP,si	100	2w	175	20	10	45	0.1	—	30	AMP
	2N1396	RCA	ppp,Dr,ge	100	100	85	*40	10	90	16	—	—	RH, TI
	2N1420	GI	npn,DP,si	*100	2	175	30	10	130	0.01	—	—	AMP
	2N1427	GI	MADT	100	60	100	*6	10	25	3	—	3.5	GI, PSI
	2N1499A	GI	MADT	100	60	100	*20	40	50	3	—	3	SPR
	2N1613	PH	ppp,MD,ge	100	3w	200	75	—	80	.0004	—	*1.3	RA,GI,TI,MO,GE,PSI
HF 35	2N1748	PH	ppp,MD,ge	100	60	100	*25	50	45	1.5	—	*1.3	—
	2N1748A	PH	ppp,MD,ge	100	60	100	25	50	70	1.5	—	*1.3	—
	2N1749	PH	ppp,MD,ge	100	75	100	*40	45	45	1.5	—	*1.3	—



General Electric transistors exceed Minuteman 99.999% reliability objective

General Electric has completed a silicon transistor reliability improvement program for the MINUTEMAN airborne guidance and control system where data on a single product has been accumulated for over 100,000,000 life test hours . . . unsurpassed in the semiconductor industry. The result is reliability without parallel. For instance, final-phase testing of 4,650 G.E. MINUTEMAN transistors to approximately 24,000,000 transistor hours at 288 mw resulted in ZERO failures. The

MINUTEMAN Part transistor made by General Electric substantially exceeds the MINUTEMAN objective of an average failure rate of 0.001%/1000 hours in continuous operation at 87 mw (25°C ambient) (see graph).

You can have this kind of reliability in *your* military and commercial applications. Just check the chart for MINUTEMAN Part Numbers, similar EIA Types, and additional MINUTEMAN Types, all produced simultaneously on the same production lines and under the same exacting conditions.

For complete specifications see your G-E Semiconductor District Sales Manager, or write Section 11E151, Semiconductor Products Department, General Electric Company, Electronics Park, Syracuse, New York. In Canada: Canadian General Electric, 189 Dufferin St., Toronto, Ontario. Export: International General Electric, 159 Madison Ave., New York 16, N.Y.

Transistor Minuteman Part No.	Silicon Transistor Description	Maximum Dissipation	V _{BE}	Nearest EIA Type No.	"Additional Minuteman Types"
551B	Unijunction	600 mw	60	2N489	MM/2N490/M MM/2N491/M MM/2N492/M MM/2N493/M MM/2N494/M
703B	Fixed-Bed Grown-diffused	500 mw	60	2N335A	MM/2N332/M MM/2N333/M MM/2N336/M
801B	Grown-diffused	250 mw	45	2N337	MM/2N338

* Furnished to either A, B or M MINUTEMAN level units.

GENERAL  ELECTRIC



SILICON POWER TRANSISTORS



7/8" HEX
200 WATT

2N1936	2N2820	STC1728
2N1937	2N2821	STC1731
2N2815	2N2822	STC1733
2N2816	2N2823	STC1736
2N2817	2N2824	STC1738
2N2818	2N2825	STC1738
2N2819	STC1726	STC1750



150 WATT

2N1015	USN2N1016B	STC1015C
2N1015A	2N1016C	STC1015D
2N1015B	USN2N1016C	STC1015E
2N1015C	2N1016D	STC1016
2N1015D	USN2N1016D	STC1016A
2N1015E	2N1016E	STC1016B
2N1016	STC1015	STC1016C
2N1016A	STC1015A	STC1016D
2N1016B	STC1015B	STC1016E



TO-36
75 WATT

2N1511	2N1514
2N1512	2N2015
2N1513	2N2016



TO-53
85 WATT

2N389	USN2N424	2N1250
USN2N389	2N424A	2N1620
2N389A	2N1210	2N1722
2N424	2N1211	2N2383



11/16" HEX
85 WATT

2N1208	2N1617
2N1209	2N1617A
2N1212	2N1618
2N1616	2N1618A
2N1616A	2N1724
	2N2384



TO-3
75 WATT

2N1069	USA2N1487	USA2N1489
2N1070	2N1488	2N1490
2N1487	USA2N1488	USA2N1490
	2N1489	2N1702



"F"
40 WATT

2N1047	2N1048A	2N1050
2N1047A	2N1048B	2N1050A
USN2N1047A	2N1049	USN2N1050A
2N1047B	2N1049A	2N1050B
2N1048	USN2N1049A	2N1768
USN2N1048A	2N1049B	2N1769



7/16" HEX
40 WATT

2N1647	2N2150
2N1648	2N2151
2N1649	2N2828
2N1650	2N2829



TO-8
25 WATT

2N1067	2N1484	2N1486
2N1068	USA2N1484	USA2N1486
2N1483	2N1485	2N1701
USA2N1483	USA2N1485	2N2035
		2N2308



TO-37
17.5 WATT

2N2036
STC1800
STC1810
STC1850



TO-5
5 WATT

2N497	2N549	2N656	2N116	2N1480	2N1482
2N498	2N550	2N656A	2N1117	USA2N1480	USA2N1482
2N547	2N551	2N657	2N1479	2N1481	2N1700
2N548	2N552	2N657A	USA2N1479	USA2N1481	2N2033
					2N2034



PNP
TO-3
75 WATT

STC5080
STC5081
STC5082
STC5083
STC5084
STC5085



PNP-11/16" HEX
85 WATT

STC5580
STC5581
STC5582

STC5583
STC5584
STC5585



PNP
TO-53
85 WATT

2P389
2P389A
2P424
2P424A

SILICON TRANSISTOR CORPORATION

CARLE PLACE, L. I., N.Y.

(516) PIONEER 2-4100

TWX-516-248-9085

ON READER-SERVICE CARD CIRCLE 449

HF continued

Cross Index Key	Type No.	Mfr.	Type	f_{ce} f_{T} f_{db} (mc)	MAX. RATINGS				CHARACTERISTICS					Remarks
					P_c (mw)	T_j (°C)	$m_w/°C$	V_{CEO} V_{CBO} (v)	I_C (ma)	h_{fe} h_{FE}	I_{CO} (μ a)	NF (db)	C_{oe} C_{ob} (pf)	
HF 36	2N1958A	SYL	npn, P, si	*100	600	175	—	*60	1000	*20-60	0.2	—	*14	RF, Mixer, Osc. on FM rec.
	2N1959A	SYL	npn, P, si	*100	600	175	—	*60	1000	*40-120	0.2	—	*14	
	2N2084	AMP	pnnp, PAD, I, ge	*100	125	90	1.93	*40	10	100	—	—	*12	
	2N2243	TI	npn, PE, si	*100	2800	200	16.0	*80	1000	*40-120	.001	—	*12	
	2N2243A	TI	npn, PE, si	*100	2800	200	16.0	*80	1000	*40-120	.001	—	*12	
	2N2459	SSD	npn, DP, si	*100	4.0	200	2.3	60	—	30-80	2na	—	*5	
HF 37	2N2463	SSD	npn, DP, si	*100	1.8	200	2.8	60	—	30-80	2na	—	*5	
	2N2515	SSD	npn, DP, si	*100	4.0	200	2.3	60	—	30-80	2na	—	*6	
	2N2516	SSD	npn, DP, si	*100	4.0	200	2.3	60	—	40-100	5na	—	*6	
	2N2518	SSD	npn, DP, si	*100	4.0	200	2.3	80	—	80-200	5na	—	*6	
	2N2519	SSD	npn, DP, si	*100	4.0	200	2.3	80	—	40-100	5na	—	*6	
	2N2520	SSD	npn, DP, si	*100	4.0	200	2.3	60	—	80-200	5na	—	*6	
HF 38	2N2521	SSD	npn, DP, si	*100	4.0	200	2.3	60	—	18-90	5na	—	*6	
	2N2522	SSD	npn, DP, si	*100	4.0	200	2.3	60	—	36-90	5na	—	*6	
	2N2523	SSD	npn, DP, si	*100	4.0	200	2.3	60	—	76-333	5na	—	*6	
	2N2524	SSD	npn, DP, si	*100	4.0	200	2.3	45	—	60-350	2na	4	*6	
	2N2524	SSD	npn, DP, si	*100	4.0	200	2.3	45	—	150-600	2na	3	*6	
	2N2601	SSD	npn, DP, si	*100	4.0	200	2.3	60	—	18-90	25na	—	*6	
HF 39	2N2602	SSD	npn, DP, si	*100	4.0	200	2.3	60	—	36-90	25na	—	*6	
	2N2603	SSD	npn, DP, si	*100	4.0	200	2.3	60	—	76-333	25na	—	*6	
	2N2604	SSD	npn, DP, si	*100	4.0	200	2.3	45	—	60-350	10na	4	*6	
	2N2605	SSD	npn, DP, si	*100	4.0	200	2.3	45	—	150-600	10na	3	*6	
	2N2800	MO	npn, PE, si	*100	800	200	4.57	*50	—	*30-90	0.1	—	*25	
	2N2801	MO	npn, PE, si	*100	800	200	4.57	*50	—	*75/225	0.1	—	*25	
HF 40	3N34	TI	npn, GD, si	100	125	150	1	30	20	4	0.4	20	—	tetrode
	OC171	AMP	npn, DJ, ge	100	60	75	2	*20	5	—	—	—	—	
	2N1752	PH	pnnp, MD, ge	106	60	100	0.8	*12	50	250	0.8	—	*1	
	2N1753	PH	pnnp, DP, si	*110	4.0	200	2.3	60	50	150-275	25na	—	*5	
	2N1947	RA	npn, MS, si	120	4w	175	26.5	60	500	25	0.1	—	20	
	2N1948	RA	npn, MS, si	120	4w	175	26.5	100	500	25	0.1	—	20	
HF 41	2N656	RA	npn, MS, si	120	4w	175	26.5	60	500	60	0.1	—	20	NA, GE, TI, PSI NA, GE, TI, PSI NA, GE, TI, PSI
	2N657	RA	npn, MS, si	120	4w	175	26.5	100	500	60	0.1	—	20	
	2N1023	RCA	npn, DJ, ge	120	120	85	—	40	10	60	12	—	—	
	2N1066	RCA	npn, DJ, ge	120	120	85	—	*40	10	60	12	—	—	
	2N1397	RCA	npn, DJ, ge	120	120	85	—	30	500	30	0.1	—	20	
	2N1409	RA	npn, MS, si	120	2.8w	150	22.5	30	500	30	0.1	—	20	
HF 42	2N1410	RA	npn, MS, si	120	2.8w	150	22.5	30	500	50	0.1	—	20	PSI, GI PSI, TR, GI, TI, MO
	2N1420	RA	npn, DO, si	*120	2w	175	13.2	60	500	200	.003	—	20	
	2N2460	SSD	npn, DP, si	*120	4.0	200	2.3	60	—	50-130	2na	—	*5	
	2N2464	SSD	npn, DP, si	*120	1.8	200	2.8	60	—	50-130	2na	—	*5	
	2N2798	SPR	pnnp, ED, ge	*120	75	100	1.0	*25	100	*30	3	—	*4	
	PT600	PSI	npn, DM, si	120	13w	175	86.7	60	—	12	1	—	40	
HF 43	PT601	PSI	npn, DM, si	120	13w	175	86.7	60	—	14	1	—	40	hi freq. hi pwr. hi freq. hi pwr. NA, MO NA, MO NA, MO TI
	2N1715	TI	npn, MS, si	125	1.2w	175	8	*50	—	1	.001	—	3	
	2N1716	TI	npn, MS, si	125	1.2w	175	8	*70	—	1	.001	—	3	
	2N1507	RA	npn, DO, si	120	2w	175	13.2	60	500	200	0.003	—	20	
	2N1785	PH	pnnp, MD, ge	125	45	85	0.75	*10	50	150	2	—	*1.5	
	2N1786	PH	pnnp, MD, ge	125	45	85	0.75	*10	50	150	2	—	*1.7	
HF 44	2N1787	PH	pnnp, MD, ge	125	45	85	0.75	*15	50	120	1.5	—	*1.5	
	2N1864	PH	pnnp, MD, ge	125	60	100	.8	*20	50	60	1.5	—	*1.6	
	2N2188	TI	pnnp, AD, ge	*125	125	—	—	40	30	90	3	—	—	
	2N2190	TI	pnnp, AD, ge	*125	125	—	—	60	30	90	3	—	—	
	2N1748A	PH	pnnp, MD, ge	*132	60	100	0.8	*25	50	70	1.5	—	*1.3	
	2N929	GI	npn, PL, si	*140	1.8w	175	3.33	45	—	40-120	3na	—	*5	
HF 45	2N930	GI	npn, PL, si	*140	1.8w	175	3.33	45	—	100-300	3na	—	*5	Tetrode
	2N1177	RCA	pnnp, DJ, ge	140	80	71	—	30	10	100	12	—	—	
	2N1178	RCA	pnnp, DJ, ge	140	80	71	—	30	10	40	12	—	—	
	2N1179	RCA	pnnp, DJ, ge	140	80	71	—	30	10	40	12	—	—	
	2N2461	SSD	npn, DP, si	*140	4.0	200	2.3	60	—	100-180	2na	—	*5	
	2N2465	SSD	npn, DP, si	*140	1.8	200	2.8	60	—	100-180	2na	—	*5	
HF 46	3N35	TI	npn, GD, si	150	125	150	1	30	20	4	0.4	14	—	
	2N728	TR	npn, JD, si	150	300	175	—	15	25	20	2.5	—	8	
	2N729	TR	npn, DJ, si	150	300	175	—	30	25	20	2.5	—	*1.5	
	2N1726	PH	pnnp, MD, ge	150	60	100	0.8	*20	50	150	1.5	—	*1.5	
	2N1727	PH	pnnp, MD, ge	150	60	100	0.8	*20	50	150	1.5	—	*1.5	
	2N1728	PH	pnnp, MD, ge	150	60	100	0.8	*20	50	150	1.5	—	*1.5	
HF 47	2N1788	PH	pnnp, MD, ge	150	60	100	0.8	*35	50	150	1.5	—	*1.5	
	2N1789	PH	pnnp, MD, ge	150	60	100	0.8	*35	50	150	1.5	—	*1.5	
	2N1790	PH	pnnp, MD, ge	150	60	100	0.8	*35	50	150	1.5	—	*1.5	
	2N2189	TI	pnnp, AD, ge	*150	125	—	—	40	30	135	3	—	—	
	2N2191	TI	pnnp, AD, ge	*150	125	—	—	60	30	135	3	—	—	
	2N2192	TI	pnnp, AD, ge	*150	125	—	—	60	30	135	3	—	—	

*The high-voltage barrier to passivated PNP transistors has finally been broken
—but it took a new manufacturing process to overcome the obstacles.*

Now from MOTOROLA

Epitaxial, Passivated PNP SILICON TRANSISTORS

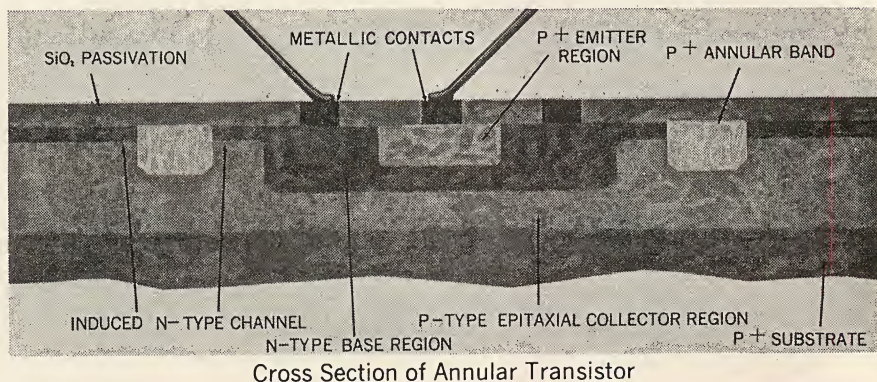
Made by the Annular* Process

Some new words are being added to the dictionary of semiconductor terms—words like Annular* and Band-Guard†, words that relate to a new manufacturing process which will have a strong influence on transistor design and promises to open new areas for transistor applications. The Annular manufacturing process provides a new degree of freedom from surface effects for semiconductor products.

For years, the industry had been working to design high voltage silicon PNP transistors with the low leakage currents normally associated with NPN types, surface passivated by the planar process. For PNP devices, planar techniques proved inadequate since any attempt to increase voltage ratings beyond approximately 20 volts (through increasing collector material resistivity) induced a phenomenon, called channeling, which actually increased leakage current far beyond tolerable levels.

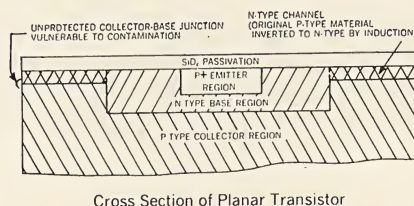
Channeling is a condition whereby the surface portion of a transistor collector region actually changes polarity and becomes an extension of the base region. The base-collector junction, therefore, rather than coming to the top surface where it is protected from the environment by a silicon oxide coating, extends to the unprotected edges of the transistor where it is subject to contamination and surface damage. This phenomenon circumvents the passivation advantages of planar designs and results in excessive leakage currents.

The formation of channels has been traced to effects of ionized or polarized particles on or within the passivating oxide coating which create an electrical environment that tends to alter the apparent polarity of the material directly



beneath the oxide—an effect which is particularly pronounced in lightly doped P-type material. The channels are random in nature and erratic in characteristics, and can be highly sensitive to radiation bombardment.

As a result of channeling, some manufacturers have reverted to earlier silicon mesa structures or have deliberately circumvented the oxide passivation in planar transistors in order to produce high voltage devices. These methods have yielded high voltage ratings but other characteristics of the resulting transistors do not compare favorably with those of surface passivated devices.



Now, Motorola has overcome these obstacles—but it has taken a new manufacturing process to do so. Rather than trying to eliminate the channel, Motorola, in a new series of “Band-Guard” transistors, has deliberately introduced a channel whose controlled characteristics completely overshadow the variable effects of any randomly induced channel, thus providing a high

degree of performance stability. Moreover the controlled channel is terminated close to the base region by a diffused annular band of the same polarity as the collector region but with a resistivity level impervious to channeling. The collector-base junction, therefore, is properly terminated underneath the oxide coating where it is protected against environmentally induced leakage currents. The resultant “Band-Guard” PNP silicon devices, for the first time, combine the low-leakage characteristics of passivated junctions with the high-voltage characteristics of non-passivated, or mesa structures.

And, if theoretical analysis of this process is confirmed by tests now in progress, they will prove to be more resistant to radiation, thus heralding improved performance and greater reliability of space equipment.

Though initially devised for the production of high voltage silicon PNP transistors, there are strong indications that the Annular process yields major benefits for NPN and field effect transistors and other semiconductor devices as well.

In view of these considerations, there is little doubt that the new, Motorola developed Annular process will take its place among the major milestones in the advancement of the semiconductor art.

*Patents Pending

†Trademark of Motorola Inc.

NOW FROM MOTOROLA

EPITAXIAL PASSIVATED

PNP SILICON TRANSISTORS

... made by the new ANNULAR PROCESS

Four new Motorola PNP silicon transistors made by the Annular process and featuring high speed . . . high voltage . . . low leakage . . . and surface passivation and stability, are now immediately available as types 2N2800, 2N2801, 2N2837, and 2N2838. Called "Band-Guard" transistors, the new devices reflect performance advantages inherent in an Annular, oxide-passivated, epitaxially fabricated transistor.

Annular Process — Provides a new degree of freedom from surface effects of adverse environments. Gives a new degree of performance stability by eliminating sub-surface leakage paths to the unprotected edges of the device. Makes possible combined high voltage *and* true silicon oxide passivation.

Oxide Surface Passivation — Prevents contamination of the junction by external agents. Makes possible the low collector leakage current (1/10th that of other PNP units) of Motorola's "Band-Guard" transistors.

Epitaxial Structure — Gives lower saturation voltage ($\frac{1}{2}$ lower) and twice the frequency response (120 mc) of ordinary PNP devices.

Other types supplied as "Band-Guard" units include 2N1132, 2N1132A, 2N1132B, and 2N722.

Motorola passivated, epitaxial "Band-Guard" transistors are immediately available from your Motorola Semiconductor Distributor or District Office. For full electrical specifications write: Technical Information Center, Motorola Semiconductor Products, Inc., Box 955, Phoenix 1, Arizona.

"Band-Guard" Transistor Performance Ratings

Characteristic	2N2800 (TO-5 pkg)	2N2801 (TO-5 pkg)	2N2837 (TO-18 pkg)	2N2838 (TO-18 pkg)	Unit
Collector-Base Breakdown Voltage ($I_c = 10 \mu\text{Adc}$, $I_E = 0$)	50	50	50	50	Vdc
Collector-Emitter Breakdown Voltage ($I_c = 100 \text{ mAdc}$, $I_E = 0$)	35	35	35	35	Vdc
Collector Cutoff Current ($V_{CE} = 25 \text{ Vdc}$, $V_{BE} = 0.5 \text{ Vdc}$)	100	100	100	100	nAdc
DC Forward Current Transfer Ratio ($I_c = 150 \text{ mAdc}$, $V_{CE} = 10 \text{ Vdc}$)*	30-90	75-225	30-90	75-225	—
Current-Gain — Bandwidth Product ($I_c = 50 \text{ mAdc}$, $V_{CE} = 10 \text{ Vdc}$, $f = 100 \text{ mc}$)	120	120	120	120	mc

*Pulse Test: Pulse Width $\leq 300 \mu\text{sec}$, duty cycle $\leq 2\%$

... also supplied as "Band-Guard" types:

Characteristic	2N1132 (TO-5 pkg)	2N1132A (TO-5 pkg)	2N1132B (TO-5 pkg)	2N722 (TO-18 pkg)	Unit
Collector-Base Breakdown Voltage ($I_c = 100 \mu\text{Adc}$, $I_E = 0$)	50	60	70	50	Vdc
Collector-Emitter Breakdown Voltage ($I_c = 100 \text{ mAdc}$ pulsed)	35	40	45	35	Vdc
Collector Cutoff Current ($V_{CE} = 30 \text{ Vdc}$, $I_E = 0$) ($V_{CE} = 50 \text{ Vdc}$, $I_E = 0$)	1.0 —	— .5	— .01	1.0 —	μAdc
DC Forward Current Transfer Ratio ($I_c = 150 \text{ mAdc}$, $V_{CE} = 10 \text{ Vdc}$)	30-90	30-90	30-90	30-90	—
Current-Gain — Bandwidth Product ($I_c = 50 \text{ mAdc}$, $V_{CE} = 10 \text{ Vdc}$, $f = 20 \text{ mc}$)	60	60	60	60	mc



"new leader in Total Silicon Technology"

MOTOROLA Semiconductor Products Inc.

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HF continued

Cross Index Key	Type No.	Mfr.	Type	f _{ae} *f _T **f _{ab} (mc)	MAX. RATINGS			CHARACTERISTICS						Remarks		
					P _c (mw)	T _i (°C)	mW/°C	V _{CEO} *V _{CBO} (v)	I _C (ma)	h _{FE} *h _{FE}	I _{CO} (μa)	NF (db)	C _{oe} *C _{ob} (pf)			
HF 43	2N2654	AMP	pn-p, AD, ge	150	100	75	0.50	*25	10	65	—	18.8	—	*3.5		
	2N2797	SPR	pn-p, ED, ge	*150	75	100°C	1.0	*20	100	*50	2	—	—	*1.5		
	2N1499A	PH	pn-p, MD, ge	*160	60	100	0.8	*20	100	150-230	2na	—	—	*5		
	2N2462	SSD	npn, DP, si	*160	4.0	200	2.3	60	—	150-230	2na	—	—	*1.5		
	2N2466	SSD	npn, DP, si	*160	1.8	200	2.8	60	—	150-230	2na	—	—	*1.5		
	2N1500	PH	pn-p, MD, ge	*175	60	100	0.8	*15	50	*70	1	—	—	*1.2		
HF 44	2N1500	GI	MAOT	175	60	100	0.8	*20	50	70	5	—	—	—		
	2N1746	PH	pn-p, MD, ge	175	60	100	0.8	*70	50	200	—	—	—	—		
	2N2207	AMP	pn-p, AD, ge	175	260	75	0.25	*70	50	200	—	—	—	—		
	2N2512	AMP	pn-p, AD, ge	175	260	75	0.25	*70	50	200	—	—	—	—		
	2N1840	PSI	npn, TOP, si	180	2	175	.013	25	500	15	3	—	—	—		
	2N2494	AMP	pn-p, AD, ge	180	100	85	1.67	*20	10	60	2.0	6	—	—		
HF 45	2N2495	AMP	pn-p, AD, ge	180	100	85	1.67	*20	10	60	2.0	6	—	—		
	2N2496	AMP	pn-p, AD, ge	180	100	85	1.67	*20	10	60	2.0	6	—	—		
	PT886	PSI	npn, TOP, si	180	1.6	175	.01	22	—	—	.3	—	—	—		
	PT887	PSI	npn, TOP, si	180	1.6	175	.01	45	—	—	.3	—	—	—		
	PT888	PSI	npn, TOP, si	180	1.6	175	.01	45	—	—	.3	—	—	—		
	2N1566	PSI	npn, TOP, si	190	3	175	.02	80	50	130	.001	—	—	—		
	2N1889	PSI	npn, TOP, si	190	3	200	.017	100	—	80	.001	—	—	—		
	2N1890	PSI	npn, TOP, si	190	3	200	.017	100	—	200	.001	—	—	—		
	2N1342	PSI	npn, TOP, si	190	2.8	175	.018	150	300	12	.01	—	—	—		
	2N1506A	PSI	npn, TOP, si	190	3.5	200	.02	80	500	60	.005	—	—	—		
	2N1564	PSI	npn, TOP, si	190	3	175	.02	80	50	30	.01	—	—	—		
HF 46	2N1565	PSI	npn, TOP, si	190	3	175	.02	80	50	60	.01	—	—	—		
	2N1893	PSI	npn, TOP, si	190	3	200	.017	120	500	80	.001	—	—	—		
	2N1893A	PSI	npn, TOP, si	190	3	200	.017	140	500	90	.001	—	—	—		
	2N1957	FA	pn-p, DD, si	*200	800	150	6.5	20	—	*60	—	—	*7.5			
	2N1955	FA	pn-p, DP, si	*200	1200	200	6.9	15	—	*75	0.0002	—	*7.5			
	2N1996	FA	pn-p, DP, si	*200	1200	200	6.9	12	—	*75	0.0002	—	5			
	2N2318	GI	npn, si	200	360	200	2.1	*1	20	60	0.05	—	—	—		
	2N2319	GI	npn, si	200	300	200	1.7	*1	20	60	0.05	—	—	5		
	2N2320	GI	npn, si	200	600	200	3.4	60	20	20-60	1	—	—	25		
	2N2403	NA	npn, si	200	8000	200	45.2	60	0.001	40-120	1	—	—	25		
	2N2404	NA	npn, si	200	8000	200	45.2	60	0.001	40-120	1	—	—	*14		
HF 47	2N2618	SYL	npn, MESA, si	*200	600	250	—	*60	750	*25	0.25	—	—	*14	High freq., high power	
	2N2618/46	SYL	npn, MESA, si	*200	400	250	—	*60	750	*25	0.25	—	—	*14		
	MM799	MO	npn, PE, si	*200	20w	175	133	*60	—	*10	0.5	—	—	—		
	MM800	MO	npn, PE, si	*200	25w	175	167	*60	—	*10	0.5	—	—	—		
	MM801	MO	npn, PE, si	*300	4w	175	26.7	*60	—	*10	0.5	—	—	—		
	2N1506	PSI	npn, MS, si	210	3w	175	0.2	60	9	—	—	—	—	8		
	2N2781	PSI	npn, TOP, si	210	13	175	.087	75	2a	30	.5	—	—	—		
	2N2782	PSI	npn, TOP, si	210	13	175	.087	100	2a	30	.5	—	—	—		
	2N2783	PSI	npn, TOP, si	210	13	175	.087	75	2a	30	.5	—	—	—		
	PT531	PSI	npn, TOP, si	210	13	175	.087	75	2a	30	.5	—	—	—		
	PT612	PSI	npn, TOP, si	210	13	175	.087	75	2a	30	.5	—	—	—		
HF 48	PT1558	PSI	npn, TOP, si	210	4	200	.023	80	—	40	.005	—	—	—	RF amp	
	PAOT28	AMP	pn-p, PADT, ge	*220	100	—	1.7	*35	10	120	2	—	—	3		
	2N1746	PH	pn-p, MD, ge	235	60	100	0.8	*15	50	—	1.8	—	—	3.8		
	2N1588	PH	pn-p, MD, ge	250	30	85	0.75	*15	50	—	—	—	—	—		
	2N1710	MO	pn-p, MS, ge	250	300	100	4	*15	50	40	.2	—	—	—		
	2N957	PSI	npn, TOP, si	250	.8	150	.006	40	—	*45	.01	—	—	—		—
HF 49	2N988	PSI	npn, TOP, si	250	1	175	.006	20	—	70	.05	—	—	—	Hi freq., hi power Hi freq., hi power Hi freq., hi power Hi freq., hi pwr.	
	2N989	PSI	npn, TOP, si	250	1	175	.006	20	—	70	.05	—	—	—		—
	2N1491	RCA	npn, MS, si	250	3w	175	20	30	50	50	10	—	—	—		—
	2N1837	PSI	npn, DM, si	250	2w	175	13.3	80	—	9	.001	—	—	—		—
	2N1837A	PSI	npn, DM, si	250	2.8w	175	18.6	80	—	9	.001	—	—	—		—
	2N1838	PSI	npn, DM, si	250	2w	175	13.3	45	—	9	0.1	—	—	—		—
	2N1839	PSI	npn, DM, si	250	2w	175	13.3	45	—	9	0.1	—	—	—		—
	2N2485	CS	npn, MS, si	*250	8.7w	200	50	120	1a	*10	500	—	—	*8		—
	2N2486	CS	npn, MS, si	*250	8.7w	200	50	140	1a	*10	500	—	—	*8		—
	2N2649	CS	npn, MS, si	*250	8.7w	200	50	65	1a	*10	500	—	—	*8		—
	2N2650	CS	npn, MS, si	*250	8.7w	200	50	25	200	50	.01	—	—	*4		—
	2N2656	PSI	npn, TOP, si	250	1.2	200	.006	25	100	*30	3	—	—	—		—
HF 49	2N2799	SPR	pn-p, ED, ge	*250	75	100	1.0	25	200	80	5	—	—	*25	SPR	
	PT720	PSI	npn, TOP, si	250	1.2	200	.006	25	200	80	5	—	—	*25		
	2N2649	CS	npn, MS, si	*250	18w	175	120	65	2a	*10	500	—	—	*25		
	2N2650	CS	npn, MS, si	*250	18w	175	120	140	2a	*10	500	—	—	*25		
	2N2656	PH	pn-p, MD, ge	*260	60	85	1.0	*20	65	—	—	—	*1.0			
	2N302A	PH	pn-p, MD, ge	*260	75	100	1.0	*30	65	—	—	—	*1.0			
2N1492	RCA	npn, MS, si	275	3w	175	20	60	50	—	10	—	—	—	—		

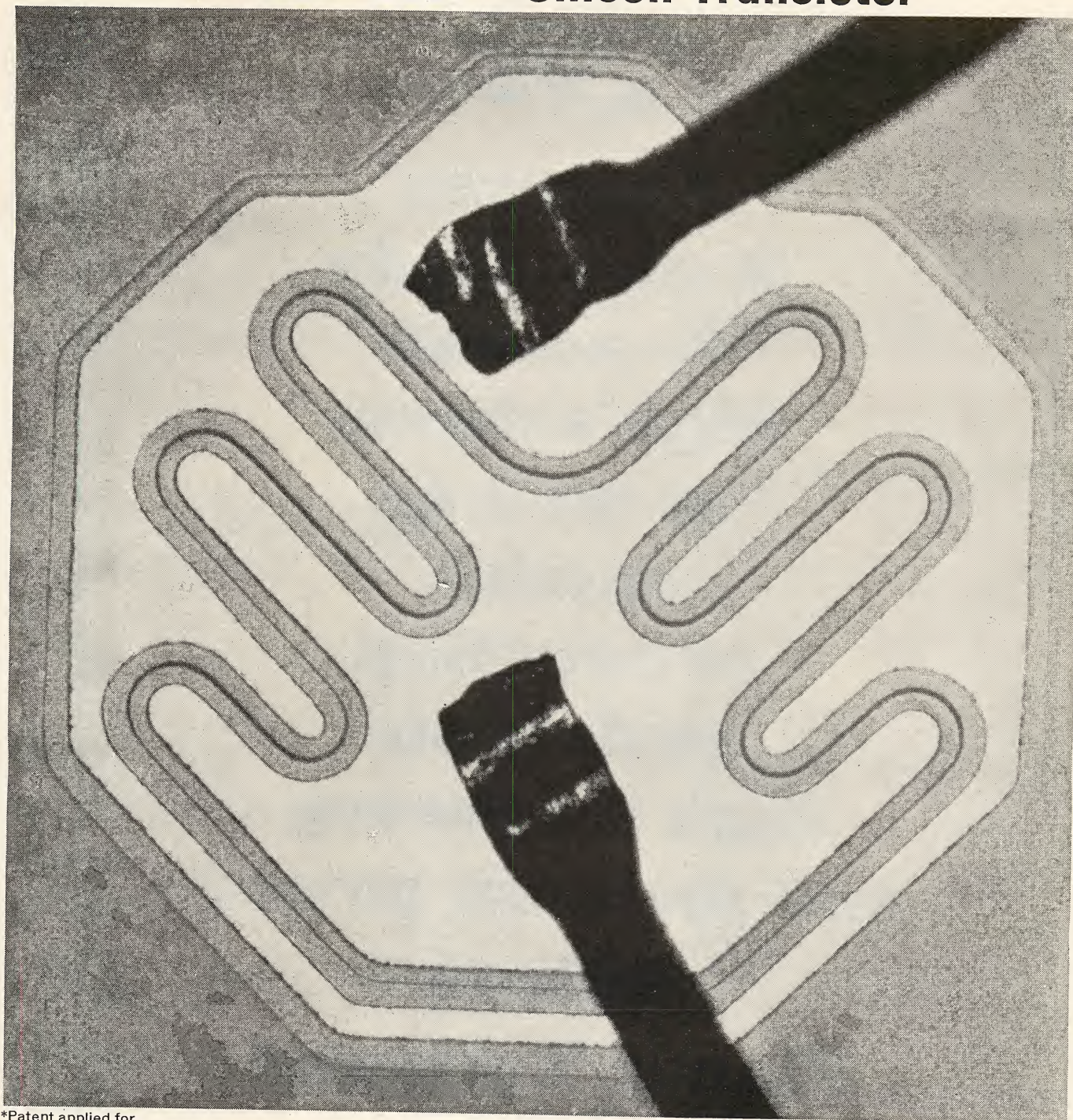
HF continued

Cross Index Key	Type No.	Mfr.	Type	MAX. RATINGS					CHARACTERISTICS					Remarks
				f_{ae} * f_T ** f_{db} (mc)	P_c (mw)	T_j (°C)	$m_w/°C$	V_{CEO} * V_{CBO} (v)	I_C (ma)	h_{fe} * h_{FE}	I_{CO} (μ a)	NF (db)	C_{oe} * C_{ob} (pf)	
HF 50	2N2635	TI	pnp, EM, ge	*295	300	100	4.0	*30	100	100	1	—	*3.5	GE
	2N695	MO	pnp, DM, ge	300	75	100	1	15	50	40	0.2	—	3.5	CL
	2N707	PSI	npn, TDP, si	300	1	175	.006	56	—	12	.005	—	—	CL
	2N834	GI	npn, si	300	360	200	2.1	*40	10	40	0.5	—	4	CL
	2N835	GI	npn, si	300	360	200	21	*25	10	30	0.5	—	4	CL
	2N916	PSI	npn, TDP, si	300	1.2	200	.006	45	—	120	.001	—	—	—
HF 51	2N960	TI	pnp, EM, ge	*300	150	—	—	—	150	*20	3	—	*4	—
	2N961	TI	pnp, EM, ge	*300	150	—	—	—	150	*20	3	—	*4	—
	2N962	TI	pnp, EM, ge	*300	150	—	—	—	150	*20	3	—	*4	—
	2N964	TI	pnp, EM, ge	*300	150	—	—	—	150	*40	3	—	*4	—
	2N965	TI	pnp, EM, ge	*300	150	—	—	—	150	*40	3	—	*4	—
	2N966	TI	pnp, EM, ge	*300	150	—	—	—	150	*40	3	—	*4	—
HF 52	2N985	RCA	pnp, EM, ge	*300	3w	175	—	—	200	*60	10	—	*6	—
	2N2493	GI	npn, MS, si	300	360	200	2.1	*40	10	80	0.1	—	6	—
	2N2381	MO	pnp, EM, ge	*300	750	100	10	*30	500	*25	1	—	*3.5	—
	2N2382	MO	pnp, EM, ge	*300	750	100	10	*45	500	*25	1	—	*3.5	—
	2N2795	SPR	pnp, ED, ge	*300	75	100°C	1.0	*15	100	*50	3	—	*3	—
	2N2796	SPR	pnp, ED, ge	*300	75	100°C	1.0	*12	100	*30	3	—	*4	—
HF 53	2N503	PH	pnp, MD, ge	320	25	85	0.5	*20	50	4.2	3	—	*1.0	SPR
	2N703	SYL	npn, P, si	*320	300	200	—	*25	200	*40-100	—	—	*6	—
	2N706	SYL	npn, P, si	*320	300	200	—	*25	200	*20	.5	—	*5	—
	2N706A	SYL	npn, P, si	*320	300	200	—	*25	200	*20-60	.5	—	*5	—
	2N706B	SYL	npn, P, si	*320	300	200	—	*25	200	*20-60	.5	—	*5	—
	2N706C	SYL	npn, P, si	*320	300	200	—	*40	200	*20-60	.025	—	*5	—
HF 54	2N706/46	SYL	npn, P, si	*320	400	200	—	*25	200	*20	.5	—	*6	—
	2N706A/46	SYL	npn, P, si	*320	400	200	—	*25	200	*20-60	.5	—	*5	—
	2N706B/46	SYL	npn, P, si	*320	400	200	—	*25	200	*20-60	.5	—	*5	—
	2N706C/46	SYL	npn, P, si	*320	400	200	—	*40	200	*20-60	.025	—	*5	—
	2N706/51	SYL	npn, P, si	*320	400	200	—	*25	200	*20-60	.5	—	*6	—
	2N706A/51	SYL	npn, P, si	*320	300	200	—	*25	200	*20-60	.5	—	*5	—
HF 55	2N706B/51	SYL	npn, P, si	*320	300	200	—	*25	200	*20-60	.025	—	*5	—
	2N968	MO	pnp, DM, ge	*320	300	100	4	*15	—	35	3	—	4.0	RA
	2N969	MO	pnp, DM, ge	*320	300	100	4	*12	—	35	3	—	4.0	RA
	2N970	MO	pnp, DM, ge	*320	300	100	4	*12	—	35	3	—	4.0	RA
	2N971	MO	pnp, DM, ge	*320	300	100	4	*7	—	35	10	—	4.0	RA
	2N972	MO	pnp, DM, ge	*320	300	100	4	*15	—	75	3	—	4.0	RA
HF 56	2N973	MO	pnp, DM, ge	*320	300	100	4	*12	—	75	3	4.0	—	RA
	2N974	MO	pnp, DM, ge	*320	300	100	4	*12	—	75	3	4.0	—	RA
	2N975	MO	pnp, DM, ge	*320	300	100	4	*12	—	75	3	4.0	—	RA
	2N2256	MO	npn, ME, si	*320	1000	175	6.67	*7	100	30	10	4.0	—	CL
	2N2257	MO	npn, ME, si	*320	1000	175	6.67	*7	100	30	3	4	—	CL
	2N2258	MO	npn, ME, si	*320	1000	175	6.67	*7	100	30	3	4	—	CL
HF 55	2N2259	MO	pnp, ME, ge	*320	300	200	—	*20	—	*20-60	1.0	—	*5	GI, SPR
	2N499	PH	pnp, MD, ge	340	30	85	9.75	30	50	8.5	1.0	—	1.3	—
	2N743	SYL	npn, P, si	*350	300	200	—	*20	—	*20-60	1.0	—	*5	—
	2N743/46	SYL	npn, P, si	*350	400	200	—	*20	—	*20-60	1.0	—	*5	—
	2N743/51	SYL	npn, P, si	*350	400	200	—	*20	—	*20-60	1.0	—	*5	—
	2N744	SYL	npn, P, si	*350	300	200	—	*20	—	*40-120	1.0	—	*5	—
HF 56	2N744/46	SYL	npn, P, si	*350	400	200	—	*20	—	*40-120	1.0	—	*5	—
	2N744/51	SYL	npn, P, si	*350	300	200	—	*20	—	*40-120	1.0	—	*5	—
	2N784A	SYL	npn, P, si	*350	300	200	—	*40	200	*25-150	.025	—	*3.5	—
	2N784A/46	SYL	npn, P, si	*350	400	200	—	*40	200	*25-150	.025	—	*3.5	—
	2N784A/51	SYL	npn, P, si	*350	300	200	—	*40	200	*25-150	.025	—	*3.5	—
	2N914	FA	npn, DP, si	*350	1200	200	6.9	*15	—	55*	0.004	—	4.5	—
HF 56	2N915	FA	npn, DP, si	*350	1200	200	6.9	50	—	*100	0.005	—	*3.0	CL, MO
	2N984	SPR	pnp, MD, ge	*350	60	100	0.8	10	100	*50	5.0	—	*2.5	—
	2N1962	SYL	npn, P, si	*350	400	200	—	*40	200	*20-80	0.25	—	*3.5	—
	2N2170	SPR	pnp, MD, ge	*350	60	100	0.8	10	100	*50	5.0	—	*3.0	—
	2N2397	SYL	npn, P, si	*350	300	200	—	*25	200	*25-125	0.10	—	*5	—
	2N2787	GI	npn, PE, si	*350	3w	175	5.33	35	—	20-60	2na	—	*5	—
HF 56	2N2788	GI	npn, PE, si	*350	3w	175	5.33	35	—	40-120	2na	—	*5	—
	2N2789	GI	npn, PE, si	*350	3w	175	5.33	35	—	100-300	2na	—	*5	—
	2N2790	GI	npn, PE, si	*350	1.8w	175	3.33	35	—	20-60	2na	—	*5	—
	2N2791	GI	npn, PE, si	*350	1.8w	175	3.33	35	—	40-120	2na	—	*5	—
	2N2792	GI	npn, PE, si	*350	1.8w	175	3.33	35	—	100-300	2na	—	*5	—
	2N741A	MO	pnp, MS, ge	360	300	100	4	*15	100	25	.2	7	6	Amp VHF
2N1407	TI	pnp, MS, ge	375	75	100	1	*20	100	100	25	0.2	7	—	

HF continued

Cross Index Key	Type No.	Mfr.	Type /	MAX. RATINGS				CHARACTERISTICS						Remarks
				f _{ae} *f _T **f _{ab} (mc)	P _c (mw)	T _j (°C)	m _w /°C	V _{CEO} *V _{CBO} (v)	I _C (ma)	h _{fe} *h _{FE}	I _{CO} (μa)	NF (db)	C _{oe} *C _{ob} (pf)	
HF 57	2N708	SYL	npn, P, si	*400	300	200	—	*40	—	*30-120	.025	—	*6	Pl. Epitaxial Pl. Epitaxial
	2N708/46	SYL	npn, P, si	*400	400	200	—	*40	—	*30-120	.025	—	*6	
	2N708/51	SYL	npn, P, si	*400	300	200	—	*40	—	*30-120	.025	—	*3.5	
	2N743	TI	npn, P, E, si	*400	1000	175	6.67	*25	200	*20-60	.002	—	*2.2	
	2N828A	MO	pnnp, DJEM, ge	*400	300	100	4	*15	200	*80	3	—	*2.2	
	2N829	MO	pnnp, DJEM, ge	*400	300	100	4	*15	200	*80	3	—	*4.0	
HF 58	2N916	FA	npn, DP, si	*400	1200	200	6.9	25	—	*50	0.002	—	—	Pl. Epitaxial Pl. Epitaxial
	2N947	FA	npn, DP, si	*400	1200	200	6.9	*60	—	*20-60	0.01	—	—	
	2N2217	MO	npn, DD, si	*400	3	175	5.33	*60	—	40-120	0.01	—	—	
	2N2218	MO	npn, DD, si	*400	3	175	5.33	*60	—	100-300	0.01	—	—	
	2N2219	MO	npn, DD, si	*400	3	175	5.33	*60	—	20-60	0.01	—	—	
	2N2220	MO	npn, DD, si	*400	1.8	175	3.33	*60	—	40-120	0.01	—	—	
HF 59	2N2221	MO	npn, DD, si	*400	1.8	175	3.33	*60	—	100-300	0.01	—	8	CL
	2N2222	MO	npn, DD, si	*400	800	200	4.57	*60	—	*50/150	0.25	—	—	
	2N2537	MO	npn, P, E, si	*400	800	200	4.57	*60	—	*100/300	0.25	—	*8	
	2N2538	MO	npn, P, E, si	*400	500	200	2.86	*60	—	*50/150	0.25	—	*8	
	2N2539	MO	npn, P, E, si	*400	500	200	2.86	*60	—	*100/300	0.25	—	—	
	2N2540	MO	npn, P, E, si	*400	3w	200	17.1	*60	200	*40	0.5	—	—	
HF 60	MM719	MO	npn, P, E, si	*425	300	200	—	*25	200	—	—	—	—	Epitaxial
	2N835	SYL	npn, P, si	*425	400	200	—	*25	200	—	—	—	*5.0	
	2N835/46	SYL	npn, P, si	*425	300	200	6.9	15	—	*50	0.004	—	*3.5	
	2N708	FA	npn, DP, si	*450	1200	200	6.67	*25	200	*40-120	.002	—	*4	
	2N744	TI	npn, P, E, si	*450	1000	175	6.67	*40	200	*25	0.5	—	—	
	2N834	SYL	npn, P, si	*450	300	200	—	*40	200	*25	0.5	—	*4	
HF 61	2N834/46	SYL	npn, P, si	*450	400	200	—	*40	200	*25	0.5	—	*4	Epitaxial, RA Epitaxial, RA Epitaxial, RA Epitaxial, RA Epitaxial, RA Epitaxial, RA
	2N834/51	SYL	npn, P, si	*450	300	200	—	*40	200	*25	0.5	—	*4	
	2N835	MO	npn, DDM, si	*450	300	175	2	*25	200	40	0.5	—	*6	
	2N914	SYL	npn, P, si	*450	300	200	—	*40	—	*30-120	.025	—	*6	
	2N914/46	SYL	npn, P, si	*450	400	200	—	*40	—	*30-120	.025	—	—	
	2N914/51	SYL	npn, P, si	*450	300	200	—	*40	—	*30-120	.025	—	*6	
HF 62	2N982	SPR	pnnp, MD, ge	*450	60	100	0.8	15	100	*65	3.0	—	*2.5	UHF Amp. MIL
	2N983	SPR	pnnp, MD, ge	*450	60	100	0.8	15	100	*65	3.0	—	*2.5	
	2N1405	TI	pnnp, MS, ge	450	75	100	1	30	50	8	2	5	—	
	2N1406	TI	pnnp, MS, ge	450	75	100	1	30	50	8	2	6	—	
	2N2168	SPR	pnnp, MD, ge	*450	60	100	0.8	15	100	*70	3.0	—	*2.5	
	2N2169	SPR	pnnp, MD, ge	*450	60	100	0.8	15	100	*65	3.0	—	*2.5	
HF 63	2N960	MO	pnnp, DM, ge	*460	300	100	4	*15	100	40	0.4	—	2.2	PG-22db @ 200mc, MO High freq., high power High freq., high power
	2N961	MO	pnnp, DM, ge	*460	300	100	4	*12	100	40	0.4	—	2.2	
	2N962	MO	pnnp, DM, ge	*460	300	100	4	*12	100	40	0.4	—	2.2	
	2N963	MO	npn, DM, ge	*460	300	100	4	*12	100	40	0.4	—	2.2	
	2N964	MO	npn, DM, ge	*460	300	100	4	*15	100	70	0.4	—	2.2	
	2N964A	MO	npn, DM, ge	*460	300	100	4	*15	100	80	0.4	—	2.2	
HF 64	2N965	MO	npn, DM, ge	*460	300	100	4	*12	100	70	0.4	—	2.2	PG-26db @ 200mc, MO
	2N966	MO	npn, DM, ge	*460	300	100	4	*12	100	70	0.4	—	2.2	
	2N967	MO	npn, DM, ge	*460	300	100	4	*12	100	70	0.4	—	2.2	
	2N1143	TI	pnnp, DB, ge	480	750	100	10	25	500	10db	1.5	—	1.5	
	2N1151	MO	pnnp, MS, ge	500	3w	100	40	*25	500	10db	1.5	—	7	
	2N1562	MO	pnnp, MS, ge	500	3w	100	40	*25	500	10db	1.5	—	7	
HF 65	2N2095	SPR	pnnp, ED, ge	*500	1w	100	—	*30	300	—	0.2	—	6.5	U.S. MIL only U.S. MIL only PG-30db @ 200mc, MO TI, MO
	2N2098	SPR	pnnp, ED, ge	*500	1w	100	—	*30	300	—	0.2	—	6.5	
	2N2501	MO	pnnp, P, E, si	*500	360	200	2.06	*40	—	*50/150	2	—	*4	
	2N700	MO	pnnp, DM, ge	600	75	100	1	*25	50	10db	0.4	6	1.1	
	2N700A	MO	pnnp, DM, ge	600	75	100	1	*25	50	5db/200mc	0.4	6	1.1	
	2N709	SYL	npn, P, si	*600	300	200	—	*15	—	*20-120	.005	—	*3	
HF 66	2N709/46	SYL	npn, P, si	*600	400	200	—	*15	—	*20-120	.005	—	*3	PG-26db @ 200mc, MO
	2N709/51	SYL	npn, P, si	*600	300	200	—	*15	—	*20-120	.005	—	*3	
	2N1142	TI	pnnp, DB, ge	600	750	100	10	30	100	10	0.7	—	1.5	
	2N2368	FA	npn, DP, si	*650	1200	200	6.9	15	—	*40	0.1	—	*2.5	
	2N2369	FA	npn, DP, si	*650	1200	200	6.9	15	—	*40	0.1	—	*2.5	
	2N1645	WE	pnnp, DJ, ge	700	—	100	12.5	*35	300	50	1.5	—	10	
HF 67	2N537	WE	pnnp, DJ, ge	750	250	100	3.3	—	100	100	2	—	2.8	U.S. MIL only U.S. MIL only PG-30db @ 200mc, MO TI, MO
	2N1094	WE	pnnp, DM, ge	750	150	100	2.0	*35	40	13	1.2	—	4	
	2N1141	TI	pnnp, DB, ge	750	750	100	10	—	100	100	1.2	—	1.5	
	2N1195	WE	pnnp, DM, ge	750	250	100	4.0	*30	50	13	1.2	—	4	
	2N709	FA	npn, DP, si	*800	1000	200	5.0	6.0	—	*55	0.005	—	*2.5	
	2N709A	SYL	npn, P, si	*800	300	200	—	*15	—	*30-90	.050	—	*3	
HF 68	2N709A/46	SYL	npn, P, si	*800	400	200	—	*15	—	*30-90	.050	—	*3	U.S. MIL only U.S. MIL only PG-30db @ 200mc, MO TI, MO
	2N709A/51	SYL	npn, P, si	*800	300	200	—	*15	—	*30-90	.050	—	*3	
2N917	FA	npn, DP, si	*800	300	200	1.71	15	—	*50	0.0005	—	*1.0		

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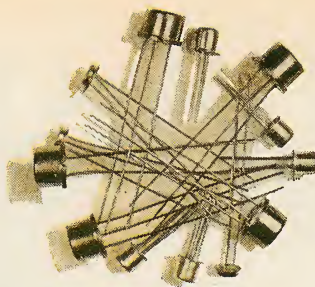
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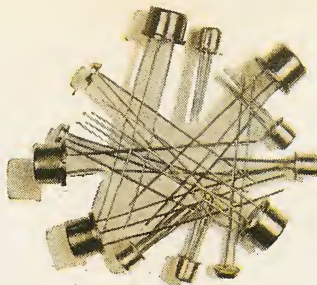
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2N657	2N720	2N1890
2N698	2N720A	2N1893

small signal and low level amplifiers

2N910	2N930
2N911	2N1973
2N912	2N1974
2N929	2N1975

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2N696	2N718	2N1420
2N697	2N718A	2N1613
2N717	2N956	2N1711

high speed saturating switches

2N706	2N708	2N914
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2N1983	2N1985	2N1987
2N1984	2N1986	2N1990

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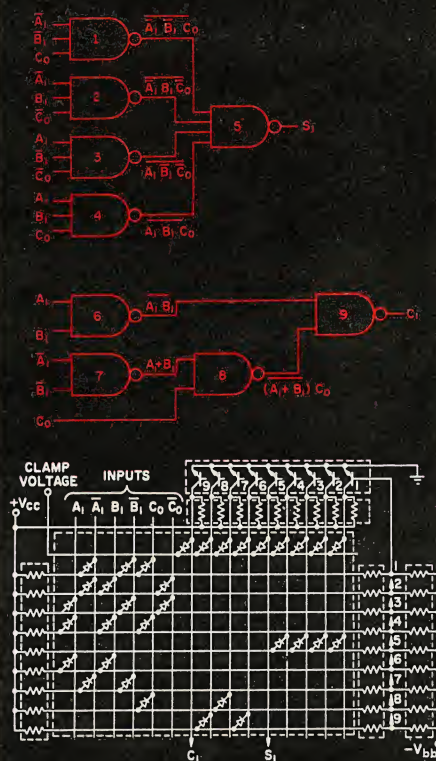
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					P _c (mw)	T _i (°C)	m _w /°C	V _{CEO} *V _{CB0} (v)	I _C (ma)	h _{FE} *h _{FE}	I _{CO} (μa)	NF (db)	C _{oe} *C _{ob} (pf)	
HF 64	2N2416	TI	pnp,DM,ge	*800	75	100	1.0	*15	20	20	1	3.4	*1.2	MO
	2N2418	FA	npn,DP,si	*900	300	200	1.71	15	—	50	0.0005	—	1.0	
	2N2415	TI	pnp,DM,ge	*900	75	100	1.0	*15	20	30	1	2.4	*1.2	
	2N2797	TI	npn,MS,ge	*1000	150	—	—	7	150	40	1.0	—	*4	
	2N2955	RCA	npn,DDM,ge	*1000	150	100	—	*12	150	10	0.5	—	*4	
	2N2808	RA	pnp,PE,si	*1000	300	200	—	*30	—	*5	0.002	7.5	*0.7	
	2N2784	SYL	npn,P,si	*1200	300	200	—	*15	—	*40-120	.005	—	*3	
	2N2784 46	SYL	npn,P,si	*1200	400	200	—	*15	—	*40-120	.005	—	*3	
	2N2784 51	SYL	npn,P,si	*1200	300	200	—	*15	—	*40-120	.005	—	*3	
	2N218	SY	pnp,AJ,ge	—	80	85	1.3	*20	—	22-110	50	—	—	
HF 65	2N231	SPR	pnp,SBT,ge	—	9	55	*0.9	*4.5	3	66	3	—	—	
	2N233	SY	npn,AJ,ge	—	50	75	1	*10	50	10	50	—	—	
	2N247	SY	pnp,DI,ge	—	80	100	1	*40	10	20-175	50	—	—	
	2N312	SY	npn,AJ,ge	—	75	85	—	*15	—	—	60	—	—	
	2N410	SY	pnp,AJ,ge	—	50	75	1	*20	—	22-110	5	—	—	
	2N504	SPR	pnp,MD,ge	—	30	85	—	*35	50	16	100	—	—	
	2N544	SY	pnp,DJ,ge	—	80	85	1.3	*18	10	20-175	4	—	—	
	2N624	SY	pnp,DJ,ge	—	100	100	1.3	*20	—	20	30	—	—	
	2N206A	GE	npn,si	—	300	175	—	25	—	2.0	0.5	—	—	
	2N706C	SY	npn,DM,si	—	360	200	2	40	50	20-60	.025	—	5.0	Planar, Epitaxial, RA CL, RA
HF 66	2N708	GE	npn,si	—	360	200	—	40	—	3.0	0.5	—	6.0	Planar Epitaxial CL, MO
	2N717	GE	npn,si	—	0.4	175	—	60	—	—	1.0	—	35	Planar Passivated, RA
	2N718	GE	npn,si	—	0.4	175	—	60	—	—	1.0	—	35	Planar Passivated, CL, PSI
	2N718A	GE	npn,si	—	0.5	200	—	75	—	30	10 ^a	12	25	Planar Passivated, PSI
	2N719	GE	npn,si	—	0.4	175	—	120	—	15	2.0	—	20	Planar Passivated, PSI
	2N719A	GE	npn,si	—	0.5	200	—	120	1.0amp	15	10 ^a	—	15	Planar Passivated, PSI
	2N720	GE	npn,si	—	0.4	175	—	120	—	30	2.0	—	20	Planar Passivated, PSI
	2N720A	GE	npn,si	—	0.5	200	—	120	—	30	—	—	15	Planar Passivated, PSI
	2N743	SY	npn,MS,si	—	300	175	2	*20	200	20-60	—	—	—	Epitaxial, CL, GI, NA, TI, MO
	2N744	SY	npn,MS,si	—	300	175	2	*20	200	40-120	1	—	—	Epitaxial, CL, GI, NA, TI, MO
HF 67	2N753	TI	npn,MS,si	—	1w	175	6.7	25	50	—	0.5	—	5	GI, NA, GE, CL
	2N768	SPR	pnp,MD,ge	—	35	100	—	*12	100	40	1	—	—	PH
	2N769	SY	pnp,MD,ge	—	35	100	—	*12	100	55	0.3	—	—	PH
	2N781	SY	pnp,MS,ge	—	150	100	2	15	*200	25	3	—	—	Epitaxial, GE
	2N782	SY	pnp,MS,ge	—	150	100	2	*12	200	20	3	—	—	Epitaxial, GE
	2N783	SY	npn,MS,si	—	300	175	2	40	200	20-60	.25	—	—	Epitaxial, CL, GI, MO
	2N784	SY	npn,MS,si	—	300	175	2	30	200	25	.25	—	—	(CL, Epitaxial), GI
	2N828	GE	pnp,ge	—	150	100	—	15	200	3.0	3.0	—	6.0	Mesa Epitaxial, RCA
	2N834	GE	npn,si	—	300	175	—	40	200	3.5	0.5	—	4.0	Planar Epitaxial CL
	2N849/TI-430	TI	npn,EP,si	—	1000	—	—	15	30	*20-60	—	—	—	
HF 68	2N850/TI-431	TI	npn,EP,si	—	1000	—	—	15	30	*40-120	—	—	—	
	2N851/TI-422	TI	npn,EP,si	—	1000	—	—	12	200	*40-120	—	—	—	
	2N852/TI-423	TI	npn,EP,si	—	1000	—	—	12	200	3.0	25mpa	—	—	
	2N914	GE	npn,si	—	360	200	—	70	—	2.5	10	—	3.5	Planar Epitaxial Planar Passivated
	2N915	GE	npn,si	—	360	200	—	—	—	—	—	—	—	
	2N929	SYL	npn,P,si	—	300	200	—	*45	—	—	—	—	—	
	2N930	SYL	npn,P,si	—	300	200	—	*45	—	—	—	—	—	
	2N955	RCA	npn,MS,ge	—	150	—	—	12	100	*60	—	—	—	
	2N960	GE	pnp,ge	—	150	100	—	15	150	20	3.0	—	4.0	Mesa Epitaxial, RA
	2N961	GE	pnp,ge	—	150	100	—	12	150	20	3.0	—	4.0	Mesa Epitaxial
HF 69	2N962	GE	pnp,ge	—	150	100	—	12	150	20	3.0	—	4.0	Mesa Epitaxial
	2N964	GE	pnp,ge	—	150	100	—	15	150	20	3.0	—	4.0	Mesa Epitaxial
	2N965	GE	pnp,ge	—	150	100	—	12	150	20	3.0	—	4.0	Mesa Epitaxial
	2N966	GE	pnp,ge	—	150	100	—	12	150	20	3.0	—	4.0	Mesa Epitaxial
	2N994	GE	pnp,ge	—	200	150	—	15	150	20	3.0	—	6.0	Mesa Epitaxial
	2N1158	PH	pnp,MD,ge	—	60	100	0.8	*20	100	50	5	—	*3	
	2N1158A	PH	pnp,MD,ge	—	75	100	1	*20	100	50	5	—	*2.8	
	2N1204	SPR	pnp,MD,ge	—	200	100	—	*20	500	40	7	—	—	
	2N1264	SY	pnp,DD,ge	—	50	75	1	*20	10	15	50	—	—	
	2N1266	SY	pnp,AJ,ge	—	80	85	1.3	*10	—	10	100	—	—	PH, MO
HF 70	2N1398	TI	pnp,MS,ge	—	50	85	—	30	10	2.3	10	5	—	
	2N1399	TI	pnp,MS,si	—	50	85	—	30	10	2.3	10	6	—	
	2N1400	TI	pnp,MS,ge	—	50	85	—	30	10	1.6	10	—	—	
	2N1401	TI	pnp,MS,ge	—	50	85	—	30	10	2	10	—	—	
	2N1401A	TI	pnp,MS,ge	—	50	85	—	30	10	2	10	—	—	
	2N1402	TI	pnp,MS,ge	—	50	85	—	30	10	2.2	10	—	—	
	2N1450	SY	pnp,AJ,ge	—	120	100	1.6	*30	100	20	10	—	—	
	2N1494	SPR	pnp,MD,ge	—	400	100	—	*20	500	15	7	—	—	
	2N1515	AMP	pnp,PAOT,ge	—	83	75	—	*20	10	60	—	—	—	
	2N1646	SY	pnp,MS,ge	—	130	100	2	*15	50	20	3	—	—	GI PH, MO OC169

HF *continued*

Cross Index Key	Type No.	Mfr.	Type	f _{ae} *f _T **f _{ab} (mc)	MAX. RATINGS					CHARACTERISTICS					Remarks
					P _c (mw)	T _j (°C)	mW/°C	V _{CEO} *V _{CBO} (v)	I _C (ma)	h _{fe} *h _{FE}	I _{CO} (μa)	NF (db)	C _{oe} *C _{ob} (pf)		
HF 71	2N1676	PH	pnnp,SAT,si	—	100	140	—	*4.5	50	10.5	.001	—	—	SPR, chopper	
	2N1677	PH	pnnp,SAT,si	—	100	140	—	4.5	50	50	0.001	—	—	Spr. Chopper	
	2N1684	SY	pnnp,AJ,ge	—	100	100	1.3	*25	100	—	5	—	—	Planar Passivated, RA	
	2N1711	GE	npn,si	—	0.8	200	—	75	—	50	10	8	25		
	2N1742	PH	pnnp,MD,ge	—	60	125	—	*20	55	*33	0.8	4.9	—		
	2N1743	PH	pnnp,MD,ge	—	60	125	—	*20	50	*33	0.8	10	—		
	2N1744	PH	pnnp,MD,ge	—	60	125	—	*20	50	*33	0.8	—	—		
	2N1745	PH	pnnp,MD,ge	—	60	100	0.8	*20	50	*33	1	—	—		
HF 72	2N1747	PH	pnnp,MD,ge	—	60	100	0.8	*20	50	70	1	—	—		
	2N1782	SY	pnnp,AJ,ge	—	100	100	1.3	*30	100	30-150	6	—	—		
	2N1783	SY	pnnp,AJ,ge	—	100	100	1.3	*30	100	30-90	5	—	—	Planar Passivated Epitaxial Epitaxial	
	2N1784	SY	pnnp,AJ,ge	—	100	100	1.3	*30	100	20	4	—	—		
	2N1841	WE	npn,DM,si	—	1250	150	100	75	2000	30	.1	—	—		
	2N1865	PH	pnnp,MD,ge	—	60	100	0.8	*20	50	70	2	—	—		
	2N1866	PH	pnnp,MD,ge	—	60	100	0.8	*35	50	70	1	—	—		
	2N1867	PH	pnnp,MD,ge	—	60	100	0.8	*35	50	50	1	—	—		
2N1868	PH	pnnp,MD,ge	—	60	100	0.8	*20	50	*33	1.5	—	—			
2N1893	GE	npn,si	—	0.8	200	—	120	—	30	15	—	15			
2N1958	SY	npn,MS,si	—	600	175	4	*60	500	20-60	0.5	—	18			
2N1959	SY	npn,MS,si	—	600	175	4	*60	500	40-120	0.5	—	18			
HF 73	2N1960	SY	pnnp,MS,ge	—	150	100	2	*15	200	25	3	—	—	Epitaxial	
	2N1961	SY	pnnp,MS,ge	—	150	100	2	*12	200	20	3	—	—	Epitaxial	
	2N1962	SY	npn,MS,si	—	400	175	2.6	*40	200	20-60	.25	—	3	Epitaxial	
	2N1963	SY	npn,MS,si	—	400	175	2.6	*30	200	25	.25	—	3.5	Epitaxial	
	2N1964	SY	npn,MS,si	—	400	175	2.6	*60	500	20-60	0.5	—	18	Epitaxial	
	2N1965	SY	npn,MS,si	—	400	175	2.6	*60	500	40-120	0.5	—	18	Epitaxial	
	2N1969	SY	pnnp,AJ,ge	—	150	100	2	*30	400	50-200	5	—	20	TI	
	2N2192	GE	npn,si	—	0.8	200	—	60	1.0a	2.5	10mμa	—	20	Planar Epitaxial	
	2N2192A	GE	npn,si	—	0.8	200	—	60	1.0a	2.5	10mμa	—	20	Planar Epitaxial	
	2N2193	GE	npn,si	—	0.8	200	—	80	1.0a	2.5	10mμa	—	20	Planar Epitaxial	
HF 74	2N2193A	GE	npn,si	—	0.8	200	—	80	1.0a	2.5	10mμa	—	20	Planar Epitaxial	
	2N2194	GE	npn,si	—	0.8	200	—	60	1.0a	2.5	10mμa	—	20	Planar Epitaxial	
	2N2194A	GE	npn,si	—	0.8	200	—	60	1.0a	2.5	10mμa	—	20	Planar Epitaxial	
	2N2195A	GE	npn,si	—	0.6	200	—	45	1.0amp	2.5	100mμa	—	20	Planar Epitaxial, RA	
	2N2360	PH	pnnp,MD,ge	—	60	125	0.75	*20	50	*33	0.8	—	—		
	2N2361	PH	pnnp,MD,ge	—	60	120	2	*20	50	*33	0.8	—	—		
	2N2362	PH	pnnp,MD,ge	—	60	120	2	*20	50	*33	0.8	—	—		
	2N2363	TI	pnnp,MS,ge	—	125	—	—	60	30	135	3	—	—		
	2N2389	TI	npn,PL,si	—	2000	—	—	35	600	*40-120	—	—	—		
	2N2395	TI	npn,PL,si	—	2000	—	—	40	300	*20-60	—	—	—		
HF 75	2N2396	TI	npn,PL,si	—	2000	—	—	40	300	*40-120	—	—	—		
	2N2398	PH	pnnp,MD,ge	—	60	100	2	*20	50	*33	0.8	—	—		
	2N2399	PH	pnnp,MD,ge	—	60	100	2	*20	50	*33	0.8	—	—		
	2N2410	TI	npn,PE,si	—	2500	—	—	30	800	*30-120	—	—	—		
	2N2411	TI	pnnp,PE,si	—	1000	—	—	20	100	*20-60	—	—	—		
	2N2412	TI	pnnp,PE,si	—	1000	—	—	20	100	*40-120	—	—	—		
	10B551	GE	npn,GP,si	—	100	125	1.0	*40	—	*30-120	50mμa	—	6.0		
	10B553	GE	npn,PE,si	—	100	125	1.0	*40	—	*30-120	.5	—	6.0		
	10B555	GE	npn,PE,si	—	100	125	1.0	*25	—	20	.5	—	6.0		
	10B556	GE	npn,PE,si	—	100	125	1.0	*25	—	*20-60	.5	—	6.0		
HF 76	10C573	GE	npn,P,si	—	100	125	1.0	*45	—	36-90	0.2	—	*8	Drift	
	10C574	GE	npn,P,si	—	100	125	1.0	*45	—	73-333	0.2	—	*8		
	11B551	GE	npn,P,si	—	100	125	1.0	*60	—	*20-60	.5	—	—		
	11B552	GE	npn,P,si	—	100	125	1.0	*60	—	*40-120	.5	—	—		
	11B554	GE	npn,P,si	—	100	125	1.0	*60	—	*40-120	25mμa	12	*25		
	11B555	GE	npn,P,si	—	100	125	1.0	*60	—	*100-300	25mμa	12	*25		
	11B556	GE	npn,P,si	—	100	125	1.0	*100	—	*40-120	25mμa	—	*15		
	11B560	GE	npn,P,si	—	100	125	1.0	*100	—	*40-120	.5	—	—		
	GT1665	GI	pnnp,AJ,ge	—	150	100	2	*100	—	25	4	—	—		
	MA-1	SPR	pnnp,MAT,ge	—	25	75	—	6	50	40	10	—	—		
HF 77	MA-2	SPR	pnnp,MAT,ge	—	20	75	—	3	50	40	10	—	—	hi freq., hi pwr. hi freq., hi pwr.	
	PT850	PSI	npn,DM,si	—	2w	175	13.3	120	—	2	2	—	—		
	PT850A	PSI	npn,DM,si	—	2.8w	175	18.6	120	—	2	2	—	—		
	SO-1	SPR	pnnp,SBT,ge	—	20	65	—	5	5	10	10	—	—		
	SO-2	SPR	pnnp,SBT,ge	—	15	65	—	3	5	10	10	—	—		
	SO-3	SPR	pnnp,SBT,ge	—	20	65	—	5	5	10	10	—	—		
ST3031	TR	npn,DJ,si	—	150	175	—	—	—	—	—	—	—	—		



THEIRS:
 $A_V = 5$



OURS:
 $A_V = 31$

■ WHY DO LOW PINCH-OFF UNIFETS* GIVE HIGHER VOLTAGE AMPLIFICATION?

BECAUSE A_V IS INVERSELY PROPORTIONAL TO V_P WHEN $V_{DD1} = V_{DD2}$ AND $V_{DS1} = V_{DS2}$. YOU ALSO GET GREATER BIAS STABILITY AND WIDER DYNAMIC RANGE.

AVAILABLE NOW IN FOUR g_m VALUES AS SHOWN. WRITE FOR FILE #841, THE DESCRIPTIVE PAPER ON LOW V_P UNIFET APPLICATIONS.

Low Pinch-off UNIFETs *(Unipolar Field-Effect Transistors) now available:

Typical	2N2841	2N2842	2N2843	2N2844	
V_P	0.8	0.8	0.8	0.8	v
g_m	90	270	800	2000	μmho
I_{DSS}	-50	-150	-450	-1000	μa
NF at 1kc	0.5	0.5	0.5	0.5	db

Pinch-off: 1.7v max.—Gate-drain breakdown: 20v min.—T0-18 package

AMPLIFICATION CALCULATIONS FOR HIGH PINCH-OFF vs. LOW PINCH-OFF UNIFETS

For all UNIFETs, it can be shown that:

$$g_{m0}^{\dagger} = \frac{2.5 I_{DSS}^{\dagger\dagger}}{V_P} \text{ within about } 20\%$$

When $V_{DD1} = V_{DD2} = -15v$ and $V_{DS1} = V_{DS2} = -5v$
then $I_{DSS1} R_{L1} = 10v$ and $I_{DSS2} R_{L2} = 10v$

Available voltage amplification, $A_V = g_m R_L$

From these equations, it can be shown that $A_{V1} = \frac{25}{V_{P1}}$ and $A_{V2} = \frac{25}{V_{P2}}$

since $V_{P1} = 5v$ $V_{P2} = 0.8v$

$A_{V1} = 5$ $A_{V2} = 31$

$\dagger g_m$ when $V_{GS} = 0$. $\dagger\dagger$ Drain-source current when $V_{GS} = 0$.



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POWER

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Cross Index Key	Type No.	Mfr.	Type	P _c (w)	MAX. RATINGS				CHARACTERISTICS					Remarks
					w/°C	T _j (°C)	V _{CEO} *V _{CBO} (v)	I _c (a)	h _{FE} *h _{FE}	I _{CO} (ma) (*μa)	f _{ae} *f _T (kc)	Powr. Gain (db)	Powr. Out. (w)	
P 1	2N2038	TR	npn	0.6	0.03	200	45	0.5	12-36	0.001	—	—	—	
	2N2039	TR	npn	0.6	0.03	200	75	0.5	12-36	0.001	—	—	—	
	2N2040	TR	npn	0.6	0.03	200	45	0.5	30-90	0.001	—	—	—	
	2N2041	TR	npn	0.6	0.03	200	75	0.5	30-90	0.001	—	—	—	
	2N2198	TR	npn	0.6	0.025	200	80	—	20-70	0.010	—	—	—	
P 2	2N957	PSI	npn,TPD,si	0.8w	0.006	150	40	—	*45	0.01	250	—	—	TR, PSI
	2N339	TI	npn,GR,si	1.0	0.008	150	55	.06	9-90	.001	6	30	—	
	2N340	TI	npn,GR,si	1.0	0.008	150	85	.06	9-90	.001	6	30	—	
	2N341	TI	npn,GR,si	1.0	0.008	150	*125	.06	9-90	.001	6	30	—	
	2N341A	TR	npn,DJ,si	1	0.008	200	*125	.1	15-90	.001	—	—	—	
	2N342	TI	npn,GR,si	1.0	0.008	150	60	.06	9-32	.001	6	30	—	TR
	2N342A	TI	npn,GR,si	1.0	0.008	150	85	0.6	9-32	—	—	—	—	
	2N342B	TI	npn,GJ,si	1.0	—	—	85	0.6	9-32	—	—	—	—	TR
	2N343	TI	npn,GR,si	1.0	0.008	150	60	.06	28-90	.001	8	30	—	
	2N343A	TR	npn,DJ,si	1	.008	150	*60	—	29-90	.001	—	—	—	
P 3	2N343B	TI	npn,GJ,si	1.0	—	—	65	0.6	28-90	—	—	—	—	MO
	2N497A	BE	npn,PL,si	1	—	200	60	—	*12-36	—	—	—	—	
	2N498A	BE	npn,PL,si	1	—	200	60	—	*12-36	—	—	—	—	
	2N656A	BE	npn,PL,si	1	—	200	60	—	*30-90	—	—	—	—	
	2N657A	BE	npn,PL,si	1	—	200	100	—	*30-90	—	—	—	—	
	2N706	FA	npn,DD,si	1.0	0.0067	175	*25	—	*45	*0.005	*400	—	—	
	2N707	PSI	npn,TDP,si	1	.006	175	56	—	12	.005ma	300	6	0.2	
	2N709	FA	npn,DP,si	1.0	0.005	200	6.0	—	*55	*0.005	*800	—	—	
	2N988	PSI	npn,TPD,si	1	0.006	175	20	—	70	0.05	250	8	0.32	
	2N989	PSI	npn,TPD,si	1	0.006	175	20	—	70	0.05	250	11	0.63	
P 4	2N1048A	BE	npn,DM,si	1	—	165	120	0.5	*12-36	—	—	—	—	BE BE BE BE
	2N1206	TR	npn,GR,si	1.0	10	200	60	—	15-19	1	—	—	—	
	2N1207	TR	npn,GR,si	1.0	10	200	*125	—	15-90	1	—	—	—	
	2N2017	GE	npn,MS,si	1.0	—	200	60	—	30	10	—	—	—	
	2N2106	GE	npn,MS,si	1.0	—	150	60	—	12-36	200*	15	—	—	
	2N2107	GE	npn,MS,SI	1.0	—	150	60	—	30-90	200*	15	—	—	
	2N2108	GE	npn,MS,si	1.0	—	150	60	—	30	200*	15	—	—	
	2N2726	GE	npn,DM,si	1.0	—	200	*200	—	*30-90	*1.0	—	—	—	
	2N2727	GE	npn,DM,si	1.0	—	200	*200	—	*75-150	*1.0	—	—	—	
	7A30	GE	npn,DM,si	1.0	—	150	*50	—	*12-36	*10	15mc	—	—	
P 5	7A31	GE	npn,DM,si	1.0	—	150	*50	—	*30-90	*10	15mc	—	—	MO CL, MO RA
	7A32	GE	npn,DM,si	1.0	—	150	*50	—	*75-200	*10	15mc	—	—	
	2N708	FA	npn,DP,si	1.2	0.0069	200	15	—	*50	*0.004	*450	—	—	
	2N869	FA	npn,DP,si	1.2	0.0069	200	18	—	*50	0.0001	150	—	—	
	2N914	FA	npn,DP,si	1.2	0.0069	200	*15	—	*55	*0.004	*370	—	—	
	2N915	FA	npn,DP,si	1.2	0.0069	200	50	—	*100	*0.005	*350	—	—	
	2N916	FA	npn,DP,si	1.2	0.0069	200	25	—	*80	*0.002	*400	—	—	
	2N947	FA	npn,DP,si	1.2	0.0069	200	—	—	*50	*0.005	*400	—	—	
	2N995	FA	npn,DP,si	1.2	0.0069	200	15	—	*60	0.0002	200	—	—	
	2N996	FA	npn,DP,si	1.2	0.0069	200	12	—	*75	0.0002	200	—	—	
P 6	2N1566	TI	npn,MS,si	1.2	—	175	*80	50	100	1	50	—	—	TR,NA RA, PSI RA, PSI
	2N2368	FA	npn,DP,si	1.2	0.0069	200	15	—	*40	*0.1	*650	—	—	
	2N2369	FA	npn,DP,si	1.2	0.0069	200	15	—	*70	*0.1	*650	—	—	
	2N2656	PSI	npn,EM,si	1.2	0.006	200	25	200	50	0.01	250	10	0.05	
	PT720	PSI	npn,TPD,si	1.2	0.006	200	25	200	80	5	250	15	0.05	
	2N721	TR	npn,PL,si	1.25	.010	200	*30	—	*20	*1	*50,000	—	—	
	2N722	TR	npn,PL,si	1.25	.010	200	*50	—	*25	*1	*60,000	—	—	
	2N978	TR	npn,PL,si	1.25	.010	200	*30	—	*15	*5	*40,000	—	—	
	2N717	FA	npn,DD,si	1.5	0.010	175	—	—	*40	*0.01	*80	—	—	
	2N718	FA	npn,DD,si	1.5	0.010	175	—	—	*80	*0.01	*100	—	—	
P 7	2N719	FA	npn,DD,si	1.5	0.010	175	—	—	*40	*0.01	*90	—	—	RA, PSI RA, PSI 0.5w @ 80mc PSI
	2N720	FA	npn,DD,si	1.5	0.010	175	—	—	*65	*0.01	*100	—	—	
	2N721	FA	npn,DD,si	1.5	0.010	175	35	—	*30	*0.01	*70	—	—	
	2N722	FA	npn,DD,si	1.5	0.010	175	35	—	*60	*0.01	*80	—	—	
	2N2786	AMP	npn,ge	1.5	35	75	*34	150	*40	—	—	10	0.5	
	PT886	PSI	npn,TPD,si	1.6	0.01	175	22	—	—	0.3	180	—	150	
	PT887	PSI	npn,TPD,si	1.6	0.01	175	45	—	—	0.3	180	6.0	750	
	PT888	PSI	npn,TPD,si	1.6	0.01	175	45	—	—	0.3	180	4.0	1000	
	2N718A	FA	npn,DP,si	1.8	0.0103	200	—	—	*80	*0.0003	*100	—	—	
	2N719A	FA	npn,DP,si	1.8	0.0103	200	60	—	*40	*0.0003	*80	—	—	

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$V_{CE(sat.)}$

0.5

V MAX. @ $I_C = 5A$

$V_{BE(sat.)}$

1.2

V MAX. @ $I_C = 5A$

I_{CBO}

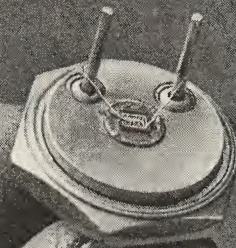
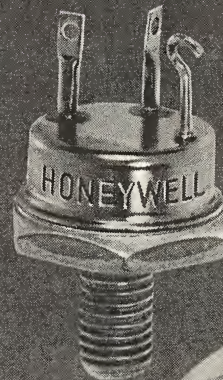
0.1

$\mu a @ V_{CB} = 60V$

$(I_C max =)$

10A

2N2811
2N2812
2N2813
2N2814
(NPN)



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2N2813	120	80	8	20-60
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Cross Index Key	Type No.	Mfr.	Type	P _c (w)	MAX. RATINGS				CHARACTERISTICS					Remarks
					θ /°C	T _i (°C)	V _{CEO} (v)	I _c (a)	h _{FE}	I _{CO} (ma)	f _{ae} *f _T (kc)	Powr. Gain (db)	Powr. Out. (w)	
P 8	2N720A	FA	npn, DP, si	1.8	0.0103	200	80	—	*80	*0.0003	*100	—	—	PSI
	2N870	FA	npn, DP, si	1.8	0.0103	200	60	—	*80	*0.0003	*70	—	—	RA
	2N871	FA	npn, DP, si	1.8	0.0103	200	60	—	*200	*0.0003	*90	—	—	RA, PSI
	2N910	FA	npn, DP, si	1.8	0.0103	200	60	—	*135	*0.0003	*80	—	—	RA, PSI
	2N911	FA	npn, DP, si	1.8	0.0103	200	60	—	*70	*0.0003	*70	—	—	RA
	2N912	FA	npn, DP, si	1.8	0.0103	200	60	—	*42	*0.0003	*60	—	—	PSI
	2N956	FA	npn, DP, si	1.8	0.0103	200	—	—	*200	*0.0003	*100	—	—	RA, PSI
	2N1890	PSI	npn, TPD, si	1.8	0.01	200	100	—	200	0.001	190	—	—	RA, PSI
P 9	2N696	FA	npn, DD, si	2.0	0.0133	175	—	—	*40	*0.01	*60	—	—	RA, PSI
	2N697	FA	npn, DD, si	2.0	0.0133	175	—	—	*75	*0.01	*80	—	—	RA, PSI
	2N699	FA	npn, DD, si	2.0	0.0133	175	—	—	*65	*0.01	*100	—	—	RA
	2N1131	FA	npn, DD, si	2.0	0.0133	175	35	—	*30	*0.01	*70	—	—	MO
	2N1132	FA	npn, DD, si	2.0	0.0133	175	35	—	*60	*0.01	*90	—	—	RA
	2N1252	FA	npn, DD, si	2.0	0.0133	175	—	—	*35	*0.1	*80	—	—	RA
	2N1253	FA	npn, DD, si	2.0	0.0133	175	—	—	*45	*0.1	*110	—	—	PSI
	2N1420	FA	npn, DD, si	2.0	0.0133	175	25	500	15	*0.01	*130	—	—	RA
P 10	2N1840	PSI	npn, TPD, si	2	0.013	175	25	—	3	0.3	180	—	—	RA
	2N1983	FA	npn, DD, si	2.0	0.016	150	25	—	4.0	*1.0	*10	—	—	RA
	2N1984	FA	npn, DD, si	2.0	0.016	150	25	—	4.0	*1.0	*10	—	—	RA
	2N1985	FA	npn, DD, si	2.0	0.016	150	25	—	4.0	*1.0	*50	—	—	RA
	2N1986	FA	npn, DD, si	2.0	0.016	150	25	—	*100	*1.0	*80	—	—	RA
	2N1987	FA	npn, DD, si	2.0	0.016	150	25	—	*50	*1.0	*80	—	—	RA
	2N1988	FA	npn, DD, si	2.0	0.016	150	45	—	*70	*1.0	*80	—	—	RA
	2N1989	FA	npn, DD, si	2.0	0.016	150	45	—	*40	*1.0	*80	—	—	RA
P 11	2N1990	FA	npn, DD, si	2.0	0.016	150	—	—	*40	*1.0	*50	—	—	RA
	2N1991	FA	npn, DD, si	2.0	0.016	150	20	—	*30	*1.0	*50	—	—	RA
	2N2303	FA	npn, DP, si	2.0	0.0133	175	—35	—	*120	*0.005	*90	—	—	high freq. high pwr.
	2N1335	PSI	npn, MS, si	2.8	0.024	150	120	.075	13	.008	70	—	—	high freq. high pwr.
	2N1336	PSI	npn, MS, si	2.8	0.024	150	120	.075	13	.008	70	—	—	high freq. high pwr.
	2N1339	PSI	npn, MS, si	2.8	0.024	150	120	.075	—	.008	70	—	—	high freq. high pwr.
	2N1340	PSI	npn, MS, si	2.8	0.024	150	120	.075	—	.008	70	—	—	high freq. high pwr.
	2N1341	PSI	npn, MS, si	2.8	0.024	150	120	.075	—	.008	70	—	—	high freq. high pwr.
P 12	2N1342	PSI	npn, TPD, si	2.8	0.018	175	150	300	12	0.01	190	8	0.7	RA, PSI
	2N698	FA	npn, DP, si	3.0	0.0172	200	60	—	*40	*0.0003	*70	—	—	high freq. high pwr., BE
	2N1505	PSI	npn, MS, si	3	0.2	175	50	—	7	—	70	—	—	high freq. high pwr., BE
	2N1506	PSI	npn, MS, si	3	0.2	175	60	—	9	—	70	—	—	high freq. high pwr., BE
	2N1506A	BE	npn, PL, si	3	—	200	50	—	*10-100	—	500 mc	—	—	high freq. high pwr.
	2N1561	MO	npn, MS, si	3	.04	100	*25	25	10	.0015	—	—	—	high freq. high pwr.
	2N1562	MO	npn, MS, si	3	.04	100	*25	25	10	.0015	450 mc	—	—	high freq. high pwr.
	2N1564	PSI	npn, TPD, si	3	0.02	175	80	50	30	0.01	190	—	—	—
P 13	2N1565	PSI	npn, TPD, si	3	0.02	175	80	50	60	0.01	190	—	—	—
	2N1566	PSI	npn, TPD, si	3	0.02	175	80	50	130	0.01	190	—	—	—
	2N1613	TR	npn, PL, si	3	.017	200	*75	—	*20	10ma	*60,000	—	—	—
	2N1613	FA	npn, DP, si	3.0	0.0172	200	—	—	*80	*0.0003	*80	—	—	—
	2N1692	MO	npn, MS, si	3	.04	100	*25	25	10 db	.0015	500 mc	6	0.5	PSI
	2N1693	MO	npn, MS, si	3	.04	100	*25	25	10 db	.0015	500 mc	6	.4	RA
	2N1711	TR	npn, PL, si	3	.017	200	*75	—	*100	10ma	*70,000	—	—	—
	2N1711	FA	npn, DP, si	3.0	0.0172	200	—	—	*130	*0.0003	*100	—	—	—
P 14	2N1890	FA	npn, DP, si	3.0	0.0172	200	60	—	*200	*0.0003	*90	—	—	—
	2N1893	FA	npn, DP, si	3.0	0.0172	200	—	—	*0.0003	*70	*70	—	—	—
	2N1893	PSI	npn, TPD, si	3	0.017	200	120	500	80	0.001	190	—	—	—
	2N1893A	PSI	npn, TPD, si	3	0.017	200	140	500	90	0.001	190	—	—	—
	2N1973	FA	npn, DP, si	3.0	0.0172	200	60	—	*135	*0.0003	*80	—	—	—
	2N1974	FA	npn, DP, si	3.0	0.0172	200	60	—	*70	*0.0003	*70	—	—	—
	2N1975	AMF	npn, DP, si	3.0	0.0172	200	60	—	*42	*0.0003	*60	—	—	—
	2N2049	FA	npn, DP, si	3.0	0.0172	200	—	—	3.0	*0.0003	—	—	—	—
P 14	2N2224	BE	npn, PL, si	3	—	200	*40	—	*40-120	—	*400	—	0.8	—
	MM719	MO	npn, PE, si	3	17.1	200	80	500	60	0.005	190	10	1.3	—
	2N1506A	PSI	npn, TPD, si	3.5	0.02	200	—	—	*60	*0.005	*400	—	—	—
	2N497	TI	npn, DJ, si	4.0	.023	200	60	200	12-36	10	9 mc	—	—	TR, FA, NA, BE, RCA
	2N498	TI	npn, DJ, si	4.0	.023	200	100	200	12-36	10	9 mc	—	—	TR, FA, NA, BE, RCA, GE
	2N656	TI	npn, DJ, si	4.0	.023	200	60	200	30-90	10	8 mc	—	—	TR, FA, NA, BE, RCA, GE
	2N657	TI	npn, DJ, si	4.0	.023	200	100	200	30-90	10	8 mc	—	—	TR
	2N1482	RCA	npn, DJ, si	4	—	175	60	1.5	50	10	1.5 mc	—	—	TR
P 14	2N1479	RCA	npn, DJ, si	4	—	175	100	1.5	50	10	1.5 mc	—	—	TR
	2N1480	RCA	npn, DJ, si	4	—	175	60	1.5	50	10	1.5 mc	—	—	TR
	2N1481	RCA	npn, DJ, si	4	—	175	100	1.5	50	10	1.5 mc	—	—	TR
	2N1482	RCA	npn, DJ, si	4	—	175	100	1.5	50	10	1.5 mc	—	—	TR
P 14	2N1615	TR	npn, ME, si	4	.023	200	*100	—	*25	*10	*25,000	—	—	—

P continued

Cross Index Key	Type No.	Mfr.	Type	P _c (w)	MAX. RATINGS			CHARACTERISTICS							Remarks
					w/°C	T _i (°C)	V _{CEO} *V _{CBO} (v)	I _c (a)	h _{FE} *h _{FE}	I _{CO} (ma) *I _{CO}	f _{oe} *f _T (kc)	Powr. Gain (db)	Powr. Out. (w)		
P 15	MHT-4401	MH	npn, EP, si	4	0.023	200	*60	0.5	20-120	0.001	80m	—	—	V _{ce} (sat)=I _v	
	MHT-4402	MH	npn, EP, si	4	0.023	200	*120	0.5	20-120	0.002	80m	—	6	V _{ce} (sat)=2v	
	MM801	MO	npn, PE, si	4	26.7	175	*60	—	—	*0.5	*300	—	—		
	PT1588	PSI	npn, TPO, si	4	0.023	200	80	—	40	0.005	210	10	1		
	ST4341	TR	npn, ME, si	4	.023	200	*80	—	*15	*80	*15,000	—	—		
P 16	2N699B	FA	npn, DP, si	5.0	0.035	200	—	—	—	*0.0004	*100	—	—	PSI	
	2N1067	STC	npn, DJ, si	5	28.5	175	60	0.5	35	5	1.5	—	—	RCA, AMF	
	2N1700	RCA	npn, si	5	—	—	*60	1.0	20	—	—	—	—	TR	
	2N2102	RCA	npn, TDP, si	5	—	—	120	1.0	35*	—	—	—	—	BE	
	2N2270	RCA	npn, TDP, si	5	—	—	60	1.0	35*	—	—	—	—	BE	
P 17	2N2297	FA	npn, DP, si	5.0	0.0286	200	—	—	*35	*0.0004	*90	—	—		
	2N121E	SY	npn, AJ, ge	6	0.1	85	*45	2	40-100	3	7	—	—		
	2N2038	TR	npn, DJ, si	6	.03	200	45	0.5	12-36	.001	—	—	—		
	2N2039	TR	npn, DJ, si	6	.03	200	75	0.5	12-36	.001	—	—	—		
	2N2040	TR	npn, DJ, si	6	.03	200	45	0.5	30-40	.001	—	—	—		
P 18	2N2041	AMP	npn, DJ, si	6	.03	200	75	0.5	30-90	.001	—	—	—		
	OC30	SY	npn, PADT, ge	6.7	.03	75	*32	1.4	35	.012	—	—	—		
	2N326	GE	npn, AJ, ge	7	0.11	85	*35	2	45	3	150	—	—		
	7F1	GE	npn, DM, si	7	—	175	*80	—	*12-36	*50	—	—	—		
	7F2	GE	npn, MS, si	7	—	175	*80	—	*30-90	*50	—	—	—		
P 19	7F3	GE	npn, DM, si	7	—	175	*120	—	*12-36	*50	—	—	—	driver	
	7F4	GE	npn, DM, si	7	—	175	*120	—	*30-90	*50	—	—	—		
	2N1172	DE	npn, AJ, ge	7.5	.1	100	*40	1.5	20	0.100	17	34	—		
	2N1183	RCA	npn, AJ, ge	7.5	—	100	45	3	20	.03	500	—	—		
	2N1183A	RCA	npn, AJ, ge	7.5	—	100	60	3	20	.03	500	—	—		
P 20	2N1183B	RCA	npn, AJ, ge	7.5	—	100	80	3	20	.03	500	—	—		
	2N1184	RCA	npn, AJ, ge	7.5	—	100	45	3	40	.03	500	—	—		
	2N1184A	RCA	npn, AJ, ge	7.5	—	100	60	3	40	.03	500	—	—		
	2N1184B	RCA	npn, AJ, ge	7.5	—	100	80	3	40	.03	500	—	—		
	2N1609	DE	npn, AJ, ge	7.5	10.0	100	60	1.5	*30/75	100	15	32	—		
P 21	2N1610	DE	npn, AJ, ge	7.5	10.0	100	60	1.5	*50/125	100	15	32	—		
	2N1610	KF	npn, AJ, ge	7.5	.1	100	*80	1 1/2	*35	*20	—	—	—		
	2N1612	KF	npn, AJ, ge	7.5	.1	100	*60	1 1/2	*35	*20	—	—	—		
	2N2403	NA	npn, si	8	0.045	200	60	1	20-60	0.001	200mc	12	1.2		
	2N2404	NA	npn, si	8	0.045	200	60	1	40-120	0.001	200mc	12	1.2		
P 22	2N2485	CS	npn, MS, si	8.7	.05	200	120	1	*10	*500	*250	7	5		
	2N2486	CS	npn, MS, si	8.7	.05	200	140	1	*10	*500	*250	5	3		
	2N2649	CS	npn, MS, si	8.7	.05	200	65	1	*10	*500	*250	5	2		
	2N2650	CS	npn, MS, si	8.7	.05	200	140	1	*10	*500	*250	6.5	4.5		
	2N122	TI	npn, GR, si	8.75	.070	150	120	140	3	10	1	28	—		
P 23	2N176	SY	npn, AJ, ge	10	0.15	90	*30	3	4.5	0.3	—	35.5	—	RCA, MO, BE	
	2N350	SY	npn, AJ, ge	10	0.13	100	*40	3	4.5	—	5	32	—	MO, BE	
	2N351	RCA	npn, AJ, ge	10	1	90	40	3	65	3	—	33.5	4	MO, SY, BE	
	2N376	RCA	npn, AJ, ge	10	1	90	40	3	78	3	—	35	4	MO, BE	
	2N669	MO	npn, AJ, ge	10	1.5	90	30	3	90	0.3	5	40	2	BE, CL	
P 24	2N1068	IND	npn, AJ, si	10	0.133	175	60	1.5	38	0.5	—	—	—	STC, RCA, AMF, BE	
	2N1714	TI	npn, MS, si	10	.134	175	60	1	—	.002	20 mc	—	—		
	2N1715	TI	npn, MS, si	10	.134	175	100	1	—	.002	20 mc	—	—		
	2N1716	TI	npn, MS, si	10	.134	175	60	1	—	.002	20 mc	—	—		
	2N1717	TI	npn, MS, si	10	.134	175	100	1	—	.002	20 mc	—	—	RA	
P 25	2N1718	TI	npn, MS, si	10	.134	175	60	1	—	.002	20 mc	—	—	RA	
	2N1719	TI	npn, MS, si	10	.134	175	100	1	—	.002	20 mc	—	—	RA	
	2N1720	TI	npn, MS, si	10	.134	175	60	1	—	.002	20 mc	—	—	RA	
	2N1721	TI	npn, MS, si	10	.134	175	100	1	—	.002	20 mc	—	—		
	2N1755	CL	npn, AJ, ge	10	2.5	95	*40	3	—	.002	20 mc	30-75	—		
P 26	2N1756	CL	npn, AJ, ge	10	2.5	95	*60	3	—	7	15	30-75	—		
	2N1757	CL	npn, AJ, ge	10	2.5	95	*80	3	—	7	15	30-75	—		
	2N1758	CL	npn, AJ, ge	10	2.5	95	*100	3	—	7	8	30-75	—		
	2N1759	CL	npn, AJ, ge	10	2.5	95	*40	3	—	7	10	60-150	—		
	2N1760	CL	npn, AJ, ge	10	2.5	95	*60	3	—	7	10	60-150	—		
P 27	2N1761	CL	npn, AJ, ge	10	2.5	95	*80	3	—	7	6	60-150	—		
	2N1762	CL	npn, AJ, ge	10	2.5	95	*100	3	—	7	6	60-150	—		
	CDT1310	CL	npn, AJ, ge	10	1.5	95	*40	5	—	15	5	40-120	—		
	CDT1311	CL	npn, AJ, ge	10	1.5	95	*60	5	—	15	5	40-120	—		
	CDT1312	CL	npn, AJ, ge	10	1.5	95	*80	5	—	15	5	40-120	—		
P 28	CDT1313	CL	npn, AJ, ge	10	1.5	95	*100	5	—	15	5	40-120	—		
	CS11739	CL	npn, AJ, ge	10	2.5	95	*40	3	—	3	7	28-39	—		
	CS11740	CL	npn, AJ, ge	10	2.5	95	*40	3	—	3	7	28-39	—		
	CS11741	CL	npn, AJ, ge	10	2.5	95	*40	3	—	3	7	32-35	—		
	CS11742	CL	npn, AJ, ge	10	2.5	95	*40	3	—	3	7	32-35	—		

P continued

Cross Index Key	Type No.	Mfr.	Type	P _c (w)	MAX. RATINGS				CHARACTERISTICS						Remarks
					w/°C	T _i (°C)	V _{CEO} CBO (v)	I _c (a)	h _{fe} *h _{FE}	I _{CO} (ma) (*μa)	f _{ae} *f _T (kc)	Pow _r . Gain (db)	Pow _r . Out. (w)		
P 22	CST1743	CL	npn,AJ,ge	10	2.5	95	*40	3	—	3	7	36-39	—	Vce (sat)=1 v	
	CST-1744	CL	npn,AJ,ge	10	2.5	95	*80	3	—	3	7	28-37	—		
	CST1745	CL	npn,AJ,ge	10	2.5	95	*80	3	—	3	7	28-33	—		
	CST1746	CL	npn,AJ,ge	10	2.5	95	*80	3	—	3	7	32-37	—		
	CTP1104	CL	npn,AJ,ge	10	2.0	85	40	3	—	2	4	28	1.2		
	CTP1105	CL	npn,AJ,ge	10	2.0	85	40	3	—	2	5	30	1.2		
	CTP1108	CL	npn,AJ,ge	10	2.0	85	20	3	—	2	4	27	0.6		
	CTP1109	CL	npn,AJ,ge	10	2.0	90	20	3	—	2	6	35	0.6		
CTP1111	CL	npn,AJ,ge	10	2.0	90	80	3	—	5	4	29	1.2			
MHT-4501	MH	npn,EP,si	10	0.057	200	*60	1	20-120	0.001	80m	—	—			
P 23	MHT-4502	MH	npn,EP,si	10	0.057	200	*120	1	20-120	0.002	80m	—	—		Vce (sat)=2 v
	2N301	RCA	npn,AJ,ge	11	—	91	40	3	70	0.1	—	—	—		BE
	2N1314	AMP	npn,PADT,ge	11	—	90	*32	3.5	33	<0.1	150	—	—		CL, RCA, BE
	2N301A	SY	npn,AJ,ge	12	0.2	85	*60	2	—	5	35	—	—		
	2N1666	AMP	npn,PADT,ge	13	—	90	*80	6	32	<100	200	—	—		hi freq., hi pwr. hi freq., hi pwr.
	2N1709	PSI	npn,DM,si	13	86.7	175	75	1.2a	—	10max	240mc	10 db	—		
	2N1710	PSI	npn,DM,si	13	86.7	175	60	1.2a	—	10max	30	8 db	—		
	2N2781	PSI	npn,TDP,si	13	.087	175	75	2	30	.5	210	5	3.2		
	2N2782	PSI	npn,TDP,si	13	.087	175	100	2	30	.5	210	5	3.2		
	2N2783	PSI	npn,TDP,si	13	.087	175	100	2	30	.1	210	5	3.5		
P 24	PT531	PSI	npn,TDP,si	13	.087	175	75	2	30	.1	210	10	3.0	2N234A	
	PT512	PSI	npn,TDP,si	13	.087	175	75	2	30	.5	210	10	5		
	2N307	BE	npn,AJ,ge	15	2.0	75	35	1.0	—	.35	—	—	—		
	2N1658	MH	npn,AJ,ge	15	0.2	100	*80	1	30-90	0.5	700	—	—		
	2N1659	MH	npn,AJ,ge	15	0.2	100	*60	1	30-90	0.5	700	—	—		
	2N2196	GE	npn,MS,si	15	—	175	80	—	30	75μa	15	—	—		
	2N2197	GE	npn,MS,si	15	—	175	80	30	*75	15	—	—	—		
	2N2201	GE	npn,DM,si	15	—	175	*120	—	*30-90	*50	—	—	—		
	2N2202	GE	npn,DM,si	15	—	175	*120	—	*30-90	*50	—	—	—		
	2N2203	GE	npn,DM,si	15	—	175	*120	—	*30-90	*50	—	—	—		
P 25	2N2204	GE	npn,DM,si	15	—	175	*120	—	*30-90	*50	—	—	—		
	2N2611	GE	npn,DM,si	15	—	175	*120	—	*12-36	*50	—	—	—		
	7B1	GE	npn,DM,si	15	—	175	*80	—	*12-36	*50	—	—	—		
	7B2	GE	npn,DM,si	15	—	175	*80	—	*30-90	*50	—	—	—		
	7B3	GE	npn,MS,si	15	—	175	120	—	12	50	15	—	—		
	7C1	GE	npn,DM,si	15	—	175	*80	—	*12-36	*50	—	—	—		
	7C2	GE	npn,DM,si	15	—	175	*80	—	*30-90	*50	—	—	—		
	7C3	GE	npn,DM,si	15	—	175	*120	—	*12-36	*50	—	—	—		
	7D1	GE	npn,DM,si	15	—	175	*80	—	*12-36	*50	—	—	—		
	7D2	GE	npn,DM,si	15	—	175	*80	—	*30-90	*50	—	—	—		
P 26	7D3	GE	npn,DM,si	15	—	175	*120	—	*12-36	*50	—	—	—	BE	
	7E1	GE	npn,DM,si	15	—	175	*80	—	*12-36	*50	—	—	—		
	7E2	GE	npn,DM,si	15	—	175	*80	—	*12-36	*50	—	—	—		
	7E3	GE	npn,DM,si	15	—	175	*120	—	*12-36	*50	—	—	—		
	7G1	GE	npn,DM,si	15	—	175	*80	—	*12-36	*50	—	—	—		
	7G2	GE	npn,DM,si	15	—	175	*80	—	*30-90	*50	—	—	—		
	7G3	GE	npn,DM,si	15	—	175	*120	—	*12-36	*50	—	—	—		
	7G4	GE	npn,DM,si	15	—	175	*120	—	*30-90	*50	—	—	—		
	2N307A	SY	npn,AJ,ge	17	0.34	75	*35	2	25	—	5	33	—		
	SN230	CS	npn,MS,si	18	.12	175	65	2	*10	*500	*250	5.7	7.5		
P 27	SN231	CS	npn,MS,si	18	.12	175	140	2	*10	*500	*250	8.5	14	BE KF KF KF 2N234A 2N234A	
	SN232	CS	npn,MS,si	18	.12	175	65	2	*10	*500	*250	4	5		
	SN234	CS	npn,MS,si	18	.12	175	140	2	*10	*500	*250	6	8		
	2N155	CL	npn,AJ,ge	20	.33	85	*30	3	20	2	5	—	2		
	2N156	RA	npn,AJ,ge	20	0.33	85	30	3	20	1	5	—	2		
	2N158	RA	npn,AJ,ge	20	0.33	85	60	3	20	1	5	—	2		
	2N158A	RA	npn,AJ,ge	20	0.33	85	80	3	20	1	5	—	2		
	2N255	BE	npn,AJ,ge	20	2.0	85	15	3	—	1.0	—	—	19-26		
	2N255A	BE	npn,AJ,ge	20	0.5	85	15	3	—	1.0	5	25	2		
	2N256	BE	npn,AJ,ge	20	2.0	85	30	3	—	1.0	—	—	22-29		
P 28	2N256A	BE	npn,AJ,ge	20	0.5	85	25	3	—	1	5	25	2	BE, KF BE, KF BE, KF BE, KF TO-10 TO-13	
	2N401	BE	npn,AJ,ge	20	1.2	90	40	3	—	1.3	—	—	—		
	2N1042	TI	npn,AJ,ge	20	.27	100	40	3	20-60	0.75	—	—	—		
	2N1043	TI	npn,AJ,ge	20	.27	100	60	3	20-60	0.75	—	—	—		
	2N1044	TI	npn,AJ,ge	20	.27	100	80	3	20-60	0.75	—	—	—		
	2N1045	TI	npn,AJ,ge	20	.27	100	100	3	20-60	0.75	—	—	—		
	2N1294	SY	npn,AJ,ge	20	0.33	85	*60	3	30min	0.5	5	—	2		
	2N1295	SY	npn,AJ,ge	20	0.33	85	*80	3	30min	0.5	5	—	2		
	2N1326	KF	npn,AJ,ge	20	0.33	85	100	3	30min	0.5	5	—	2		
	2N1437	KF	npn,AJ,ge	20	0.33	85	100	3	20min	0.5	5	—	2		

P continued

Cross Index Key	Type No.	Mfr.	Type	P _c (w)	MAX. RATINGS			CHARACTERISTICS						Remarks
					W, °C	T _j (°C)	V _{CEO} *V _{CBO} (v)	I _c (a)	h _{FE} *h _{FE}	I _{CO} (ma) (*μa)	f _{oe} *f _T (kc)	Powr. Gain (db)	Powr. Out. (w)	
P 29	2N1438	KF	pnp,AJ,ge	20	0.33	85	100	3	20min	0.5	5	—	2	TO-10
	2N1465	KF	pnp,AJ,ge	20	0.33	85	120	3	20min	0.5	5	—	2	TO-13
	2N1466	KF	pnp,AJ,ge	20	0.33	85	120	3	20min	0.5	5	—	2	TO-10
	2N1504	KF	pnp,AJ,ge	20	0.33	85	80	3	20min	0.5	5	—	2	
	2N2552	KF	pnp,AJ,ge	20	.27	100	*40	1	*33	*40	10	—	—	
	2N2553	KF	pnp,AJ,ge	20	.27	100	*60	1	*33	*40	10	—	—	
	2N2554	KF	pnp,AJ,ge	20	.27	100	*80	1	*33	*40	10	—	—	
	2N2555	KF	pnp,AJ,ge	20	.27	100	*100	1	*33	*40	10	—	—	
P 30	2N2556	KF	pnp,AJ,ge	20	.27	100	*40	1	*33	*40	10	—	—	
	2N2557	KF	pnp,AJ,ge	20	.27	100	*60	1	*33	*40	10	—	—	
	2N2558	KF	pnp,AJ,ge	20	.27	100	*80	1	*33	*40	10	—	—	
	2N2559	KF	pnp,AJ,ge	20	.27	100	*100	1	*33	*40	10	—	—	
	2N2560	KF	pnp,AJ,ge	20	.27	100	*40	3	*25	*40	10	—	—	
	2N2561	KF	pnp,AJ,ge	20	.27	100	*60	3	*25	*40	10	—	—	
	2N2562	KF	pnp,AJ,ge	20	.27	100	*80	3	*25	*40	10	—	—	
	2N2563	KF	pnp,AJ,ge	20	.27	100	*100	3	*25	*40	10	—	—	
P 31	2N2563	CL	pnp,AJ,ge	20	1.5	100	*40	5	20-60	15	5	—	—	
	2N2564	CL	pnp,AJ,ge	20	1.5	100	*60	5	20-60	15	5	—	—	
	2N2565	CL	pnp,AJ,ge	20	1.5	100	*80	5	20-60	15	5	—	—	
	2N2566	CL	pnp,AJ,ge	20	1.5	*100	100	5	20-60	15	5	—	—	
	2N2567	CL	pnp,AJ,ge	20	1.5	*100	100	5	20-60	15	5	—	—	
	2N2568	RA	pnp,AJ,ge	20	0.33	85	80	3	—	1	5	—	—	
	2N2569	RA	pnp,AJ,ge	20	0.33	85	100	3	—	1	5	—	—	
	2N2570	RA	pnp,AJ,ge	20	0.33	85	120	3	—	1	5	—	—	
P 32	2N2571	RA	pnp,AJ,ge	20	0.33	85	150	3	—	1	5	—	—	
	2N2572	RA	pnp,AJ,ge	20	0.33	85	200	3	—	1	5	—	—	
	2N2573	MO	pnp,AJ,ge	20	133	175	*60	—	*10	*0.5	*200	—	12	
	2N2574	BE	pnp,AJ,ge	25	1.2	90	30	3	—	1	—	—	34	CL
	2N2575	BE	pnp,AJ,ge	25	1.2	90	40	3	—	1.0	—	—	36	CL
	2N2576	BE	pnp,AJ,ge	25	1.2	90	40	3	—	1.0	—	—	38	CL
	2N2577	BE	pnp,AJ,ge	25	1.2	95	40	3	—	1.0	—	—	35	CL
	2N2578	BE	pnp,AJ,ge	25	1.2	95	40	3	—	1.0	—	—	—	
P 33	2N2579	BE	pnp,AJ,ge	25	1.2	95	40	3	—	1.0	—	—	39	hFE 20 min., CL
	2N2580	SY	pnp,AJ,ge	25	0.33	100	*60	2	20	4	—	—	—	BE
	2N2581	BE	pnp,AJ,ge	25	1.2	90	40	3	—	1.5	—	—	33	
	2N2582	BE	pnp,AJ,ge	25	1.2	95	40	3	—	1.3	—	—	35	
	2N2583	CL	pnp,AJ,ge	25	0.7	95	*40	15	—	25	4	—	6	BE
	2N2584	CL	pnp,AJ,ge	25	0.7	95	*60	15	—	25	4	—	—	BE
	2N2585	CL	pnp,AJ,ge	25	0.7	95	*80	15	—	25	4	—	—	BE
	2N2586	CL	pnp,AJ,ge	25	0.7	95	*100	15	—	25	4	—	—	BE
P 34	2N2587	CL	pnp,AJ,ge	25	0.7	95	*40	15	—	25	4	—	—	solder lugs, BE
	2N2588	CL	pnp,AJ,ge	25	0.7	95	*60	15	—	25	4	—	—	solder lugs, BE
	2N2589	CL	pnp,AJ,ge	25	0.7	95	*80	15	—	25	4	—	—	solder lugs, BE
	2N2590	CL	pnp,AJ,ge	25	0.7	95	*100	15	—	25	4	—	—	solder lugs, BE
	2N2591	CL	pnp,AJ,ge	25	0.7	95	*40	15	—	25	4	—	—	STC, AMF
	2N2592	CL	pnp,AJ,ge	25	0.7	95	*60	15	—	25	4	—	—	STC, AMF
	2N2593	CL	pnp,AJ,ge	25	0.7	95	*80	15	—	25	4	—	—	STC, AMF
	2N2594	CL	pnp,AJ,ge	25	0.7	95	*100	15	—	25	4	—	—	STC, AMF
P 35	2N2595	CL	pnp,AJ,ge	25	0.7	95	*40	15	—	25	4	—	—	STC, AMF
	2N2596	CL	pnp,AJ,ge	25	0.7	95	*60	15	—	25	4	—	—	STC, AMF
	2N2597	CL	pnp,AJ,ge	25	0.7	95	*80	15	—	25	4	—	—	STC, AMF
	2N2598	CL	pnp,AJ,ge	25	0.7	95	*100	15	—	25	4	—	—	STC, AMF
	2N2599	CL	pnp,AJ,ge	25	0.7	95	*40	15	—	25	4	—	—	STC, AMF
	2N2600	CL	pnp,AJ,ge	25	0.7	95	*60	15	—	25	4	—	—	STC, AMF
	2N2601	CL	pnp,AJ,ge	25	0.7	95	*80	15	—	25	4	—	—	STC, AMF
	2N2602	CL	pnp,AJ,ge	25	0.7	95	*100	15	—	25	4	—	—	STC, AMF

P continued

Cross Index Key	Type No.	Mfr.	Type	P _c (w)	MAX. RATINGS				CHARACTERISTICS					Remarks
					w/°C	T _i (°C)	V _{CEO} *V _{CBO} (v)	I _c (a)	h _{FE} *h _{FE}	I _{CO} (ma) *I _{CO} (ma)	f _{ae} *f _T (kc)	Pow _r . Gain (db)	Pow _r . Out. (w)	
P 36	2N1261	MH	pn-p, A ₁ ge	32	0.45	100	*80	3	20-50	2	400	—	—	KF
	2N1262	MH	pn-p, A ₁ ge	32	0.45	100	*80	3	30-75	2	400	—	—	KF
	2N1263	MH	pn-p, A ₁ ge	32	0.45	100	*80	3	45-113	2	400	—	—	KF
	2N1501	MH	pn-p, A ₁ ge	32	0.45	100	*60	3	25-100	2	400	—	—	KF
	2N1502	MH	pn-p, A ₁ ge	32	0.45	100	*40	3	25-100	2	400	—	—	KF
	CA202	MH	pn-p, A ₁ ge	32	0.45	100	20	3	*20	4	400	—	—	MO
	2N463	WE	pn-p, A ₁ ge	35	0.2	95	60	5	30-75	15	—	—	—	MO
	2N1011	BE	pn-p, A ₁ ge	37	2.0	100	*80	3	—	3	5	25	—	MO
	2N256	DE	pn-p, A ₁ ge	37	2.0	100	*35	3	—	3	5	—	—	MO
	2N307	DE	pn-p, A ₁ ge	37	2.0	100	*35	3	*20	15	3	—	—	MO
P 37	2N663	DE	pn-p, A ₁ ge	37	2.0	100	*50	4	*25/75	4	15	—	—	BE
	2N178	MO	pn-p, A ₁ ge	40	1.4	90	*40	3	50	—	6	30	—	BE
	2N354	MO	pn-p, A ₁ ge	40	1.4	90	*15	3	50	—	6	35	—	TR, TI, BE
	2N555	MO	pn-p, A ₁ ge	40	1.4	90	*30	3	50	—	6	—	—	TR, TI, BE
	2N1047	STC	pn-p, A ₁ ge	40	0.2	200	80	2	12-36	.015	—	—	—	TR, BE
	2N1047A	TI	pn-p, MS, si	40	.228	200	80	0.5	12-36	.0015	8 mc	—	—	TR, BE
	2N1047B	TI	pn-p, DM, si	40	—	—	80	0.75	12-36	—	90	—	—	TR, TI, BE
	2N1047C	BE	pn-p, DM, si	40	—	165	80	8	*12-36	—	—	—	—	TR, TI, BE
	2N1048	STC	pn-p, DJ, si	40	0.2	200	120	2	12-36	.015	—	—	—	TR, STC, BE
	2N1048A	TI	pn-p, MS, si	40	.228	200	120	0.5	12-36	.0015	8 mc	—	—	TR, STC, BE
P 38	2N1048B	TI	pn-p, DM, si	40	—	—	120	0.75	30*-90*	—	—	—	—	STC, BE
	2N1048C	BE	pn-p, DM, si	40	0.2	200	80	8	*12-36	.015	—	—	—	TR, TI, BE
	2N1049	STC	pn-p, DJ, si	40	0.2	200	80	2	30-90	.0015	7 mc	—	—	TR, STC, BE
	2N1049A	TI	pn-p, MS, si	40	.228	200	80	0.5	30-90	—	—	—	—	BE
	2N1049B	STC	pn-p, D, si	40	—	—	80	—	—	—	—	—	—	BE
	2N1049C	BE	pn-p, DM, si	40	—	200	80	8	*30-90	—	—	—	—	TI
	2N1050	STC	pn-p, DJ, si	40	0.2	200	120	2	30-90	.015	—	—	—	STC
	2N1050A	TI	pn-p, MS, si	40	.228	200	120	5	30-90	7 mc	—	—	—	TR, TI, BE
	2N1050B	TI	pn-p, DM, si	40	—	—	120	0.75	30*-90*	—	—	—	—	TR, STC, BE
	2N1050C	BE	pn-p, DM, si	40	—	200	120	8	*30-90	—	—	—	—	STC, BE
P 39	2N1647	TR	pn-p, DJ, si	40	.27	175	*80	3	15-45	.025	10 mc	—	—	BE
	2N1648	TR	pn-p, DJ, si	40	.27	175	*120	3	15-45	.025	10 mc	—	—	BE
	2N1649	TR	pn-p, DJ, si	40	.27	175	*80	3	30-90	.025	10 mc	—	—	BE
	2N1650	TR	pn-p, DJ, si	40	.27	175	*120	3	30-90	.025	10 mc	—	—	BE
	2N1650	STC	pn-p, D, si	40	—	—	80	—	—	—	—	—	—	TI
	2N1691	TI	pn-p, DM, si	40	—	—	120	0.5	*20*-60	—	—	—	—	STC
	2N1886	TR	pn-p, DJ, si	40	.27	175	60	5	20-80	.35	8 mc	—	—	BE
	2N2018	TR	pn-p, DJ, si	40	.27	175	*150	3	20-80	.01	10 mc	—	—	BE
	2N2019	TR	pn-p, DJ, si	40	.27	175	*200	—	20-60	.01	10 mc	—	—	BE
	2N2020	TR	pn-p, DJ, si	40	.27	175	*150	—	40-120	.01	10 mc	—	—	BE
P 40	2N2021	TR	pn-p, DJ, si	40	.27	175	*200	—	40-120	.01	10 mc	—	—	Planar
	MHT-6001	MH	pn-p, DP, si	40	—	175	100	3	10-120	0.001	30 mc	—	—	MO
	2N1120	BE	pn-p, A ₁ ge	45	1.0	95	*80	15	20-50	15	—	—	—	CL, BE
	2N250	TI	pn-p, A ₁ ge	50	.27	100	60	5	60	2	—	30	—	BE, CL
	2N251	TI	pn-p, A ₁ ge	50	.27	100	60	5	60	2	—	30	—	BE
	2N553	DE	pn-p, A ₁ ge	50	1.5	100	*80	5	—	0.02	25	—	—	BE
	2N665	DE	pn-p, A ₁ ge	50	1.5	100	*80	5	—	0.02	25	—	—	JAN2N665
	2N1014	RCA	pn-p, A ₁ ge	50	1.0	100	100	10	75	0.1	1	—	—	RCA, AMF, FT, BE
	2N1069	STC	pn-p, A ₁ ge	50	.29	175	60	4	20	1	1	—	—	RCA, AMF, FT, BE
	2N1070	STC	pn-p, DJ, si	50	.29	175	60	4	20	1	1	—	—	STC
	2N1722	TI	pn-p, MS, si	50	.67	175	80	7.5	—	1	20 mc	—	—	STC
P 41	2N1724	TI	pn-p, MS, si	50	.67	175	80	7.5	—	1	20 mc	—	—	STC
	2N1905	RCA	pn-p, Dr, ge	50	0.7	—	100	10	90	.15	—	—	—	CL
	2N1906	RCA	pn-p, Dr, ge	50	0.7	—	100	10	90	.15	—	—	—	CL
	2N2266	MH	pn-p, A ₁ ge	50	0.5	125	*100	5.0	25-75	2	400	—	—	CL
	2N2267	MH	pn-p, A ₁ ge	50	0.5	125	*120	5.0	25-75	2	400	—	—	CL
	2N1722	TR	pn-p, PL, si	50	0.5	175	80	7.5	*20	—	*10,000	—	60	—
	2N1724	TR	pn-p, PL, si	50	0.5	175	80	7.5	*20	—	*10,000	—	60	—
	2N1704	NA	pn-p, si	50-200	500	175	3.3	45	100	0.1	—	15	—	—
	2N1657	RA	pn-p, DB, si	55	.33	200	60	2	50	10	10 mc	—	—	—
	2N1722	TI	pn-p, MS, si	50	.67	175	80	7.5	—	1	20 mc	—	—	—
	2N1724	TI	pn-p, MS, si	50	.67	175	80	7.5	—	1	20 mc	—	—	—
P 42	2N419	BE	pn-p, A ₁ ge	60	1.2	95	45	3	—	0.5	—	—	5	CL
	2N639	BE	pn-p, A ₁ ge	60	1.2	100	40	5	15-30	1.0	—	—	—	CL
	2N639A	BE	pn-p, A ₁ ge	60	1.2	100	70	5	15-30	1.0	—	—	—	CL
	2N639B	BE	pn-p, A ₁ ge	60	1.2	100	80	5	15-30	2.2	—	—	—	—
	2N1073	BE	pn-p, A ₁ ge	60	1.0	100	80	10	20-6	2.0	1.5	—	—	—
	2N1073A	BE	pn-p, A ₁ ge	60	1.0	100	80	10	20-6	1.5	—	—	—	DE
	2N1073B	BE	pn-p, A ₁ ge	60	1.0	100	120	10	20-6	2.0	1.5	—	—	CL
	2N1136	BE	pn-p, A ₁ ge	60	1.2	100	40	6	—	0.5	—	—	—	CL
	2N1136A	BE	pn-p, A ₁ ge	60	1.2	100	70	6	—	2	—	—	—	CL
	2N1136B	BE	pn-p, A ₁ ge	60	1.2	100	80	6	—	2	—	—	—	CL

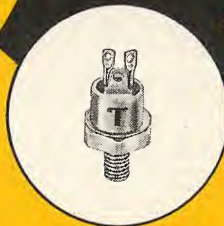
SILICON PLANAR POWER TRANSISTORS

PNP 2N2875

Features remarkably high beta linearity over wide range of collector currents. Dissipates up to 15 Watts of power at 100°C case.

Type	DC Current Gain @ $I_c = 500\text{mA}$ (β)	Typical Collector Saturation Voltage @ $I_c = 500\text{mA}$ (Volts)	Minimum Sustaining Voltage @ $I_c = 50\text{mA}$ (Volts)	Typical Cut-Off Frequency @ $I_c = 100\text{mA}$ (Mc)	Power Dissipation Rating @ 100°C Case (Watts)
2N2875	20-60	1.0	50	30	15

IN A
 $\frac{1}{16}$ " STUD-
MOUNTED
PACKAGE



NPN 2N2866-7

Features extremely low RCS of 0.75 Ohms Max. Dissipates up to 20 Watts of power at 100°C case. High beta linearity.

Type	DC Current Gain @ $I_c = 500\text{mA}$ (β)	Typical Collector Saturation Voltage @ $I_c = 1\text{Amp}$ (Volts)	Minimum Sustaining Voltage @ $I_c = 50\text{mA}$ (Volts)	Typical Cut-Off Frequency @ $I_c = 100\text{mA}$ (Mc)	Power Dissipation Rating @ 100°C Case (Watts)
2N2866	20-60	0.4	80	15	20
2N2867	40-120	0.4	80	15	20

TRANSITRON'S NEW STATE-OF-THE-ART SILICON PLANAR TRANSISTORS FEATURE GREATER RELIABILITY, LOWER RCS, AND PERMIT FURTHER CIRCUIT SIMPLIFICATION IN DEMANDING POWER CATEGORIES.

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These highly reliable silicon planar power transistors are the product of the

same intensive Transitron Total Reliability Program that produced the popular $\frac{1}{16}$ " NPN 2N1647-50 and 2N2018-21 series for modern military ICBM systems. Continuous lot control from ingot stage, thorough product improvement documentation, and comprehensive failure analysis have enabled Transitron Product Engineering to develop units which will satisfy the strictest requirements.

The 2N2875 and the 2N2866-7, and other complementing PNP and NPN silicon power transistors, are available through your Transitron Distributor.

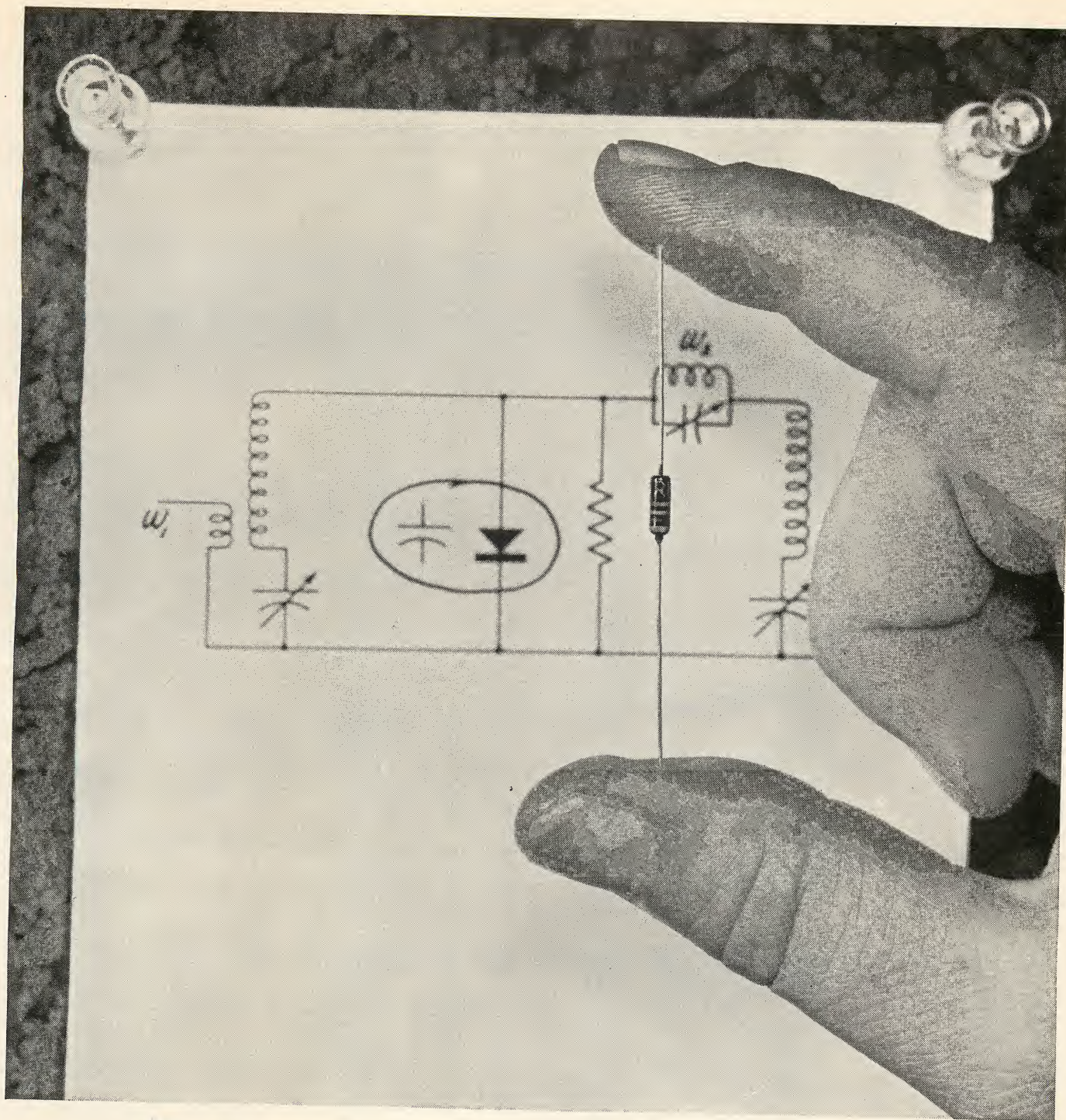
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P continued

Cross Index Key	Type No.	Mfr.	Type	MAX. RATINGS				CHARACTERISTICS						Remarks
				P _c (w)	T _i (°C)	V _{CEO} +V _{CB0} (v)	I _c (a)	h _{FE} *h _{FE}	I _{CO} (ma) (*µa)	f _{ae} *f _T (kc)	Powr. Gain (db)	Powr. Out. (w)		
													w/°C	
P 43	2N1137	BE	pn-p, A, J, ge	60	100	40	6	—	0.5	—	—	—	—	CL
	2N1137A	BE	pn-p, A, J, ge	60	100	70	6	—	2	—	—	—	—	CL
	2N1137B	BE	pn-p, A, J, ge	60	100	80	6	—	2	—	—	—	—	CL
	2N1138	BE	pn-p, A, J, ge	60	100	40	6	—	0.5	—	—	—	—	CL
	2N1138A	BE	pn-p, A, J, ge	60	100	70	6	—	2.0	—	—	—	—	CL
	2N1138B	BE	pn-p, A, J, ge	60	100	80	6	—	2	—	—	—	—	CL
	2N1210	TR	pn-p, D, J, si	60	175	*60	5	15-75	30	15 mc	—	—	—	STC, FN, FT
	2N1211	TR	pn-p, D, J, si	60	175	*80	5	15-75	30	15 mc	—	—	—	STC, FN, FT
P 44	2N1467	RCA	pn-p, D, J, si	60	175	60	6	30	25	1 mc	—	—	—	STC, FT, AMF, BE
	2N1468	RCA	pn-p, D, J, si	60	175	100	6	30	25	1 mc	—	—	—	STC, FT, AMF, BE
	2N1469	RCA	pn-p, D, J, si	60	175	100	6	30	25	1.25mc	—	—	—	STC, FT, AMF, BE
	2N1616	TR	pn-p, D, J, si	60	175	60	5	15-75	30	15 mc	—	—	—	AMF, FT, STC, BE
	2N1617	TR	pn-p, D, J, si	60	175	70	5	15-75	30	15 mc	—	—	—	AMF, FT, STC, BE
	2N1618	TR	pn-p, D, J, si	60	175	80	5	15-75	30	15 mc	—	—	—	AMF, FT, STC, BE
	ST440	TR	pn-p, D, J, si	60	150	60	5	10	1	—	—	—	—	STC
	2N2137	MO	pn-p, A, J, ge	62.5	100	*30	3	30-60	2	20	—	—	—	"Meg-A-Life"
P 45	2N2137A	MO	pn-p, A, J, ge	62.5	100	30	3	30-60	2	20	—	—	—	"Meg-A-Life"
	2N2138	MO	pn-p, A, J, ge	62.5	100	45	3	30-60	2	20	—	—	—	"Meg-A-Life"
	2N2139	MO	pn-p, A, J, ge	62.5	100	60	3	30-60	2	20	—	—	—	"Meg-A-Life"
	2N2140	MO	pn-p, A, J, ge	62.5	100	75	3	30-60	2	20	—	—	—	"Meg-A-Life"
	2N2141	MO	pn-p, A, J, ge	62.5	100	90	3	30-60	2	20	—	—	—	"Meg-A-Life"
	2N2142	MO	pn-p, A, J, ge	62.5	100	30	3	50-100	2	20	—	—	—	"Meg-A-Life"
	2N2143	MO	pn-p, A, J, ge	62.5	100	45	3	50-100	2	20	—	—	—	"Meg-A-Life"
	2N2144	MO	pn-p, A, J, ge	62.5	100	60	3	50-100	2	20	—	—	—	"Meg-A-Life"
P 46	2N2145	MO	pn-p, A, J, ge	62.5	100	75	3	50-100	2	20	—	—	—	"Meg-A-Life"
	2N2146	MO	pn-p, A, J, ge	62.5	100	90	3	50-100	2	20	—	—	—	"Meg-A-Life"
	2N301	DE	pn-p, A, J, ge	75	100	*40	3	*62.5	3	5	—	—	—	"Meg-A-Life"
	2N301A	DE	pn-p, A, J, ge	75	100	*60	3	*62.5	3	5	—	—	—	"Meg-A-Life"
	2N174A	TS	pn-p, A, J, ge	75-95	95	*80	15	*37	8	10	—	—	—	MO, SO, DE
	2N1511	RCA	pn-p, si	75	—	60	6	15*	—	—	—	—	—	STC
	2N1512	RCA	pn-p, si	75	—	100	6	*15	—	—	—	—	—	STC
	2N1513	RCA	pn-p, si	75	—	60	6	*25	—	—	—	—	—	STC
P 47	2N1514	RCA	pn-p, si	75	—	100	6	*25	—	—	—	—	—	STC
	2N1703	RCA	pn-p, si	75	—	60	5	*15	—	—	—	—	—	STC
	2N2101	AMF	pn-p, MESA, si	75	200	*60	3.0	*15-60	*1	1.5mc	—	—	—	STC, TR, RA, FT, AMF, BE
	3N45	MH	pn-p, A, J, ge	75	100	*60	12	30-120	3.0	750	—	—	—	STC, TR, RA, AMF, FT, BE
	3N46	MH	pn-p, A, J, ge	75	100	*80	12	20-80	3.0	450	—	—	—	AMF, BE
	3N47	MH	pn-p, A, J, ge	75	100	*40	12	30-120	3	750	—	—	—	STC, TR, RA, FN, FT
	3N48	MH	pn-p, A, J, ge	75	100	*60	12	20-80	3	450	—	—	—	STC, TR, RA, FT, AMF, BE
	2N424	TI	pn-p, D, J, si	85	200	*80	2	12.60	10	6 mc	—	—	—	STC, TR, RA, AMF, FT, BE
P 48	2N424	TI	pn-p, D, J, si	85	200	80	2	12-60	10	6 mc	—	—	—	STC, TR, RA, AMF, FT, BE
	2N389	STC	pn-p, D, J, si	85	200	60	2	12-60	10	7 mc	—	—	—	AMF, BE
	2N389A	STC	pn-p, D, J, si	85	200	60	2	12-60	10	7 mc	—	—	—	STC, TR, RA, FN, FT
	2N424	TI	pn-p, D, J, si	85	200	*80	2	12.60	10	6 mc	—	—	—	STC, TR, RA, AMF, FT, BE
	2N1619	TR	pn-p, D, J, si	85	200	80	5	30	0.1	15 mc	—	—	—	STC, TR, RA, AMF, FT, BE
	2N1660	RA	pn-p, DB, si	85	200	60	2	90	10	40 mc	—	—	—	AMF, BE
	2N1661	RA	pn-p, DB, si	85	200	80	2	90	10	40 mc	—	—	—	STC, TR, RA, AMF, FT, BE
	2N1662	RA	pn-p, DB, si	85	200	100	2	90	10	40 mc	—	—	—	STC, TR, RA, FN, FT
P 49	2N1894	RA	pn-p, DB, si	85	200	60	2	30	.01	—	—	—	—	STC, TR, RA, AMF, FT, BE
	2N1895	RA	pn-p, DB, si	85	200	80	2	30	.01	—	—	—	—	STC, TR, RA, AMF, FT, BE
	2N1896	RA	pn-p, DB, si	85	200	60	2	30	.01	—	—	—	—	STC, TR, RA, AMF, FT, BE
	2N1897	RA	pn-p, DB, si	85	200	80	2	30	.01	—	—	—	—	STC, TR, RA, AMF, FT, BE
	2N1898	RA	pn-p, DB, si	85	200	100	2	30	.01	—	—	—	—	STC, TR, RA, AMF, FT, BE
	2N2383	STC	pn-p, D, J, si	85	180	80	5	*20-60	*3.0	*3.0mc	—	—	—	5Q, Flange
	2N2384	STC	pn-p, D, J, si	85	180	80	5	*20-60	*3.0	*3.0mc	—	—	—	1 lex Stud
	2N2526	MO	pn-p, AD, ge	85	110	80	10	*20-50	3	—	—	—	—	5Q, Flange
2N2527	MO	pn-p, AD, ge	85	110	120	10	*20-50	3	—	—	—	—	5Q, Flange	
P 49	2N2528	MO	pn-p, AD, ge	85	110	160	10	*20-50	3	—	—	—	—	5Q, Flange
	STC1101	STC	pn-p, D, J, si	85	200	60	6	10-50	.025	1 mc	—	—	—	5Q, Flange
	STC1102	STC	pn-p, D, J, si	85	200	100	6	10-50	.025	1 mc	—	—	—	5Q, Flange
	STC1103	STC	pn-p, D, J, si	85	200	60	6	25-75	.025	1 mc	—	—	—	5Q, Flange
	STC1104	STC	pn-p, D, J, si	85	200	100	6	25-75	.025	1 mc	—	—	—	5Q, Flange
	2N176	DE	pn-p, A, ge	90	100	*40	7	*25/90	3	4	25	25	—	5Q, Flange
	2N255A	DE	pn-p, A, ge	90	100	*15	5	—	5	—	—	—	—	5Q, Flange
	2N256A	DE	pn-p, A, ge	90	100	*25	5	—	5	—	—	—	—	5Q, Flange
P 49	2N297A	MO	pn-p, A, J, ge	90	100	*60	3	40-100	3	5	—	—	—	DE, BE, CL
	2N350A	MO	pn-p, A, J, ge	90	100	*50	3	30	3	5	—	—	—	BE, CL
	2N351A	MO	pn-p, A, J, ge	90	100	*50	4	45	3	5	—	—	—	BE, CL
	2N376A	MO	pn-p, A, J, ge	90	100	*50	5	60	3	5	—	—	—	BE, CL
	2N376A	MO	pn-p, A, J, ge	90	100	*50	5	60	3	5	—	—	—	BE, CL
	2N376A	MO	pn-p, A, J, ge	90	100	*50	5	60	3	5	—	—	—	BE, CL
	2N376A	MO	pn-p, A, J, ge	90	100	*50	5	60	3	5	—	—	—	BE, CL
	2N376A	MO	pn-p, A, J, ge	90	100	*50	5	60	3	5	—	—	—	BE, CL



Raytheon introduces new F7 series of 63 VHF-UHF varactor diodes

Now available for use in medium power frequency multipliers and converters, these new Raytheon varactor diodes offer outstanding series resistance characteristics, a wide variety of types, and parameters maintained to close tolerances. The new F7 series varactors are mounted in standard glass packages with axial leads and are usable in frequency multipliers from 2 Mc to 2 Gc at input power levels from 0.1 to 10 watts. For immediate delivery contact your nearest Raytheon Field Office or, Raytheon Company, Semiconductor Division, 350 Ellis Street, Mountain View, California.

Cutoff frequency:	30-100 Gc
Normalization power:	5-20 kw
Reverse breakdown voltage:	45-120 v in 15 v steps
Junction capacitance at BVR:	1.8-8.2 pf in 10% EIA values
Series resistance:	0.33-2.2 ohm in 20% EIA values
Power dissipation:	1 watt
Price:	\$15.00 (1-24) \$9.90 (25-99)
Availability:	standard values in stock, others 10-30 days

RAYTHEON

P continued

Cross Index Key	Type No.	Mfr.	Type	P _c (w)	MAX. RATINGS				CHARACTERISTICS					Remarks
					w/°C	T _i (°C)	V _{CE0} *V _{CBO} (v)	I _c (a)	h _{FE} *h _{FE}	f _{CO} (ma) (*μa)	f _{ae} *f _T (kc)	Powr. Gain (db)	Powr. Out. (w)	
P 50	2N379	DE	npn,AJ,ge	90	.8	100	*80	7	*20/90	8	3	—	—	BE, CL BE, CL BE, CL
	2N380	DE	npn,AJ,ge	90	.8	100	*60	7	*20/90	8	3	—	—	
	2N627	MO	npn,AJ,ge	90	1.2	100	*40	10	10-30	4	5	38	—	
	2N628	MO	npn,AJ,ge	90	1.2	100	*60	10	10-30	4	5	38	—	
	2N629	MO	npn,AJ,ge	90	1.2	100	*80	10	10-30	4	5	38	—	
	2N630	MO	npn,AJ,ge	90	1.2	100	*100	10	10-30	4	5	38	—	BE, CL
	2N677	BE	npn,AJ,ge	90	1.2	100	50	15	45	1	—	—	—	CL
	2N677A	BE	npn,AJ,ge	90	1.2	100	60	15	45	1	—	—	—	CL
	2N677B	BE	npn,AJ,ge	90	1.2	100	90	15	45	1	—	—	—	CL
2N677C	BE	npn,AJ,ge	90	1.2	100	100	15	45	1	—	—	—	CL	
P 51	2N678	BE	npn,AJ,ge	90	1.2	100	150	15	75	1	—	—	—	CL
	2N678A	BE	npn,AJ,ge	90	1.2	100	60	15	75	1	—	—	—	CL
	2N678B	BE	npn,AJ,ge	90	1.2	100	90	15	75	1	—	—	—	CL
	2N678C	BE	npn,AJ,ge	90	1.2	100	100	15	75	1	—	—	—	CL
	2N1031	BE	npn,AJ,ge	90	0.8	100	30	15	20-60	1.0	—	—	—	CL
	2N1031A	BE	npn,AJ,ge	90	0.8	100	40	15	20-60	1.0	—	—	—	CL
	2N1031B	BE	npn,AJ,ge	90	0.8	100	70	15	20-60	1.0	—	—	—	CL
	2N1031C	BE	npn,AJ,ge	90	0.8	100	80	15	20-60	2.0	—	—	—	CL
	2N1032	BE	npn,AJ,ge	90	0.8	100	30	15	50-100	1.0	—	—	—	CL
2N1032A	BE	npn,AJ,ge	90	0.8	100	40	15	50-100	1.0	—	—	—	CL	
P 52	2N1032B	BE	npn,AJ,ge	90	0.8	100	70	15	50-100	2.0	—	—	—	CL
	2N1032C	BE	npn,AJ,ge	90	0.8	100	80	15	50-100	2	—	—	—	CL
	2N1073	DE	npn,AJ,ge	90	0.8	110	*40	10	*20/60	10	30	—	—	
	2N1073A	DE	npn,AJ,ge	90	0.8	110	*80	10	*20/60	10	30	—	—	
	2N1073B	DE	npn,AJ,ge	90	0.8	110	*120	10	*20/60	10	30	—	—	
	2N1162	MO	npn,AJ,ge	90	1.2	100	50	25	15-65	3	4	—	—	CL, BE
	2N1162A	MO	npn,AJ,ge	90	1.2	100	*50	25	15-65	15	4	—	—	BE, CL
	2N1163	MO	npn,AJ,ge	90	1.2	100	*50	25	15-65	3	4	—	—	CL, BE
	2N1163A	MO	npn,AJ,ge	90	1.2	100	*50	25	15-65	15	4	—	—	BE
2N1164	MO	npn,AJ,ge	90	1.2	100	*80	25	15-65	3	4	—	—	CL, BE	
P 53	2N1164A	MO	npn,AJ,ge	90	1.2	100	*80	25	15-65	15	4	—	—	BE
	2N1165	MO	npn,AJ,ge	90	1.2	100	*80	25	15-65	3	4	—	—	CL, BE
	2N1165A	MO	npn,AJ,ge	90	1.2	100	*80	25	15-65	15	4	—	—	BE
	2N1166	MO	npn,AJ,ge	90	1.2	100	*80	25	15-65	3	4	—	—	CL, BE
	2N1166A	MO	npn,AJ,ge	90	1.2	100	*100	25	15-65	15	4	—	—	BE
	2N1167	MO	npn,AJ,ge	90	1.2	100	*100	25	15-65	3	4	—	—	CL, BE
	2N1167A	MO	npn,AJ,ge	90	1.2	100	*100	25	15-65	15	4	—	—	BE
	2N1358M	DE	npn,AJ,ge	90	0.8	110	*80	15	25/50	4	5.0	—	—	
	2N1359	MO	npn,AJ,ge	90	1.2	100	*50	3	35-90	3	7	—	—	BE
2N1360	MO	npn,AJ,ge	90	1.2	100	*50	3	60-140	3	5	—	—	BE	
P 54	2N1362	MO	npn,AJ,ge	90	1.2	100	*100	3	35-90	3	7	—	—	BE
	2N1363	MO	npn,AJ,ge	90	1.2	100	*100	3	60-140	3	5	—	—	BE
	2N1364	MO	npn,AJ,ge	90	1.2	100	*120	3	35-90	3	7	—	—	BE
	2N1365	MO	npn,AJ,ge	90	1.2	100	*120	3	60-140	3	5	—	—	BE
	2N1529	MO	npn,AJ,ge	90	1.2	100	*40	5	20-40	2	10	—	—	CL, BE
	2N1529A	MO	npn,AJ,ge	90	1.2	100	*40	5	20-40	2	10	—	—	BE
	2N1530	MO	npn,AJ,ge	90	1.2	100	*40	5	20-40	2	10	—	—	CL, BE
	2N1530A	MO	npn,AJ,ge	90	1.2	100	*60	5	20-40	2	10	—	—	BE
	2N1531	MO	npn,AJ,ge	90	1.2	100	*80	5	20-40	2	10	—	—	CL, BE
2N1531A	MO	npn,AJ,ge	90	1.2	100	*80	5	20-40	2	10	—	—	BE	
P 55	2N1532	MO	npn,AJ,ge	90	1.2	100	*100	5	20-40	2	10	—	—	CL, BE
	2N1532A	MO	npn,AJ,ge	90	1.2	100	*100	5	20-40	2	10	—	—	BE
	2N1533	MO	npn,AJ,ge	90	1.2	100	*120	5	20-40	2	10	—	—	CL, BE
	2N1534	MO	npn,AJ,ge	90	1.2	100	*40	5	*35-70	2	8.5	—	—	CL, DE, BE
	2N1534A	MO	npn,AJ,ge	90	1.2	100	*40	5	35-70	2	8.5	—	—	BE
	2N1535	MO	npn,AJ,ge	90	1.2	100	*60	5	*35-70	2	8.5	—	—	CL, DE, BE
	2N1535A	MO	npn,AJ,ge	90	1.2	100	*60	5	35-70	2	8.5	—	—	BE
	2N1536	MO	npn,AJ,ge	90	1.2	100	*80	5	*35-70	2	8.5	—	—	CL, DE, BE
	2N1536A	MO	npn,AJ,ge	90	1.2	100	*80	5	35-70	2	8.5	—	—	BE
2N1537	MO	npn,AJ,ge	90	1.2	100	100	5	35-70	2	8.5	—	—	CL, DE, BE	
P 56	2N1537A	MO	npn,AJ,ge	90	1.2	100	*100	5	35-70	2	8.5	—	—	BE
	2N1538	MO	npn,AJ,ge	90	1.2	100	*120	5	35-70	2	8.5	—	—	CL, BE
	2N1539	MO	npn,AJ,ge	90	1.2	100	*40	5	50-100	2	4	—	—	CL, BE
	2N1539A	MO	npn,AJ,ge	90	1.2	100	*40	5	50-100	2	4	—	—	BE
	2N1540	MO	npn,AJ,ge	90	1.2	100	*60	5	50-100	2	4	—	—	CL, BE
	2N1540A	MO	npn,AJ,ge	90	1.2	100	*60	5	50-100	2	4	—	—	BE
	2N1541	MO	npn,AJ,ge	90	1.2	100	*80	5	50-100	2	4	—	—	CL, BE
	2N1541A	MO	npn,AJ,ge	90	1.2	100	*80	5	50-100	2	4	—	—	BE
	2N1542	MO	npn,AJ,ge	90	1.2	100	*100	5	50-100	2	4	—	—	CL, BE
2N1542A	MO	npn,AJ,ge	90	1.2	100	*100	5	50-100	2	4	—	—	BE	

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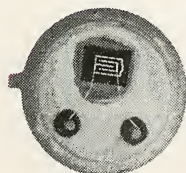
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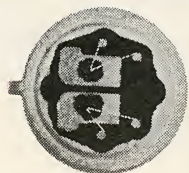
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Amelco Special Assemblies (ASA's) consist of any combination of those devices which are a standard product, mounted in a single header. ASA's in general are any specially selected multiple transistor combination such as Differential Amplifiers and Darlington configurations.

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All standard Amelco transistors are available in Micro-Chip form for ultra-small assemblies. The semiconductor chip is bonded to a molybdenum substrate; junctions and surfaces are protected by a passivated surface of silicon oxide. The chip is coated for mechanical protection and is individually packed with conductive strips connected to the Micro-Chip's leads for testing in the package.

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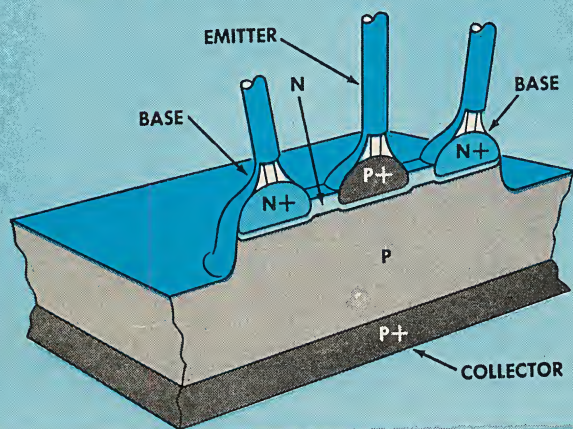
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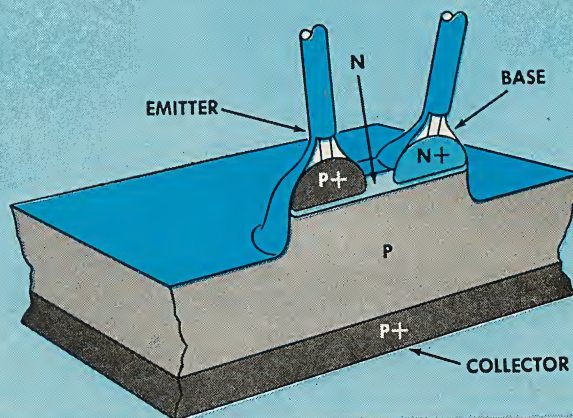


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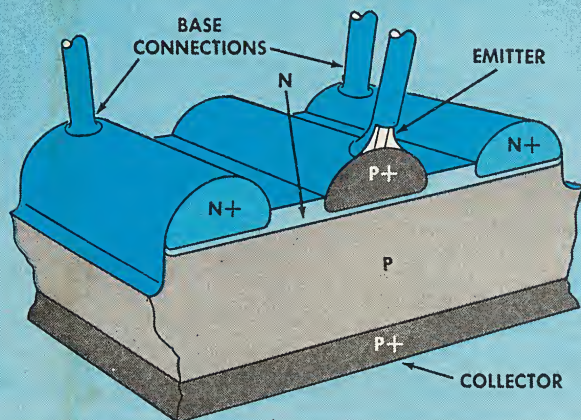
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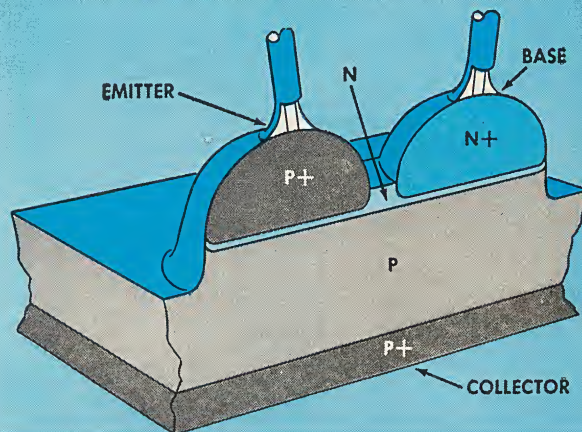
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P.A.D.T. 2N2671	VHF	P.A.D.T. 2N2672	RF

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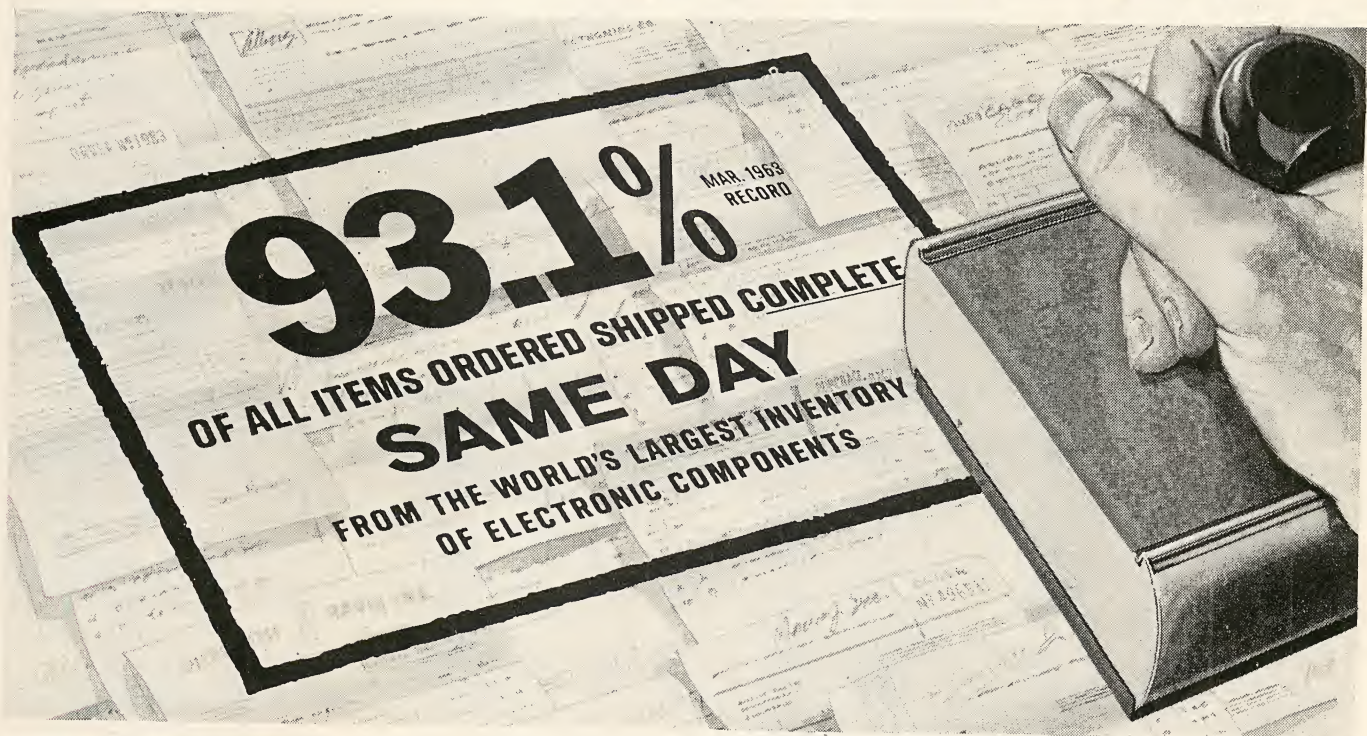


P continued

Cross Index Key	Type No.	Mfr.	Type	P _c (w)	MAX. RATINGS				CHARACTERISTICS				Remarks	
					w/°C	T _i (°C)	V _{CEO} *V _{CBO} (v)	I _c (a)	h _{FE} *h _{FE}	I _{CO} (ma) *I _T (μa)	f _{ae} *f _T (kc)	Pow _r . Gain (db)		Pow _r . Out. (w)
P 57	2N1543	MO	npn,AJ,ge	90	1.2	100	*120	5	50-100	2	4	—	—	CL, BE
	2N1544	MO	npn,AJ,ge	90	1.2	100	*40	5	75-150	2	4	—	—	CL, BE
	2N1544A	MO	npn,AJ,ge	90	1.2	100	*40	5	75-150	2	4	—	—	BE
	2N1545	MO	npn,AJ,ge	90	1.2	100	*60	5	75-150	2	4	—	—	CL, BE
	2N1545A	MO	npn,AJ,ge	90	1.2	100	*60	5	75-150	2	4	—	—	BE
	2N1546	MO	npn,AJ,ge	90	1.2	100	*80	5	75-150	2	4	—	—	CL, BE
	2N1546A	MO	npn,AJ,ge	90	1.2	100	*80	5	75-150	2	4	—	—	BE
	2N1547	MO	npn,AJ,ge	90	1.2	100	*100	5	75-150	2	4	—	—	CL, BE
P 58	2N1547A	MO	npn,AJ,ge	90	1.2	100	*100	5	75-100	2	4	—	—	BE
	2N1548	MO	npn,AJ,ge	90	1.2	100	*120	5	75-150	2	4	—	—	CL, BE
	2N1549	MO	npn,AJ,ge	90	1.2	100	*40	15	10-30	3	10	—	—	CL, BE
	2N1549A	MO	npn,AJ,ge	90	1.2	100	*40	15	10-30	3	10	—	—	BE
	2N1550	MO	npn,AJ,ge	90	1.2	100	*60	15	10-30	3	10	—	—	CL, BE
	2N1550A	MO	npn,AJ,ge	90	1.2	100	*60	15	10-30	3	10	—	—	BE
	2N1551	MO	npn,AJ,ge	90	1.2	100	*80	15	10-30	2	10	—	—	CL, BE
	2N1551A	MO	npn,AJ,ge	90	1.2	100	*80	15	10-30	3	10	—	—	BE
P 59	2N1552	MO	npn,AJ,ge	90	1.2	100	*100	15	10-30	2	10	—	—	CL, BE
	2N1552A	MO	npn,AJ,ge	90	1.2	100	*100	15	10-30	3	10	—	—	BE
	2N1553	MO	npn,AJ,ge	90	1.2	100	*40	15	30-60	2	6	—	—	CL, BE
	2N1553A	MO	npn,AJ,ge	90	1.2	100	*40	15	30-60	3	6	—	—	BE
	2N1554	MO	npn,AJ,ge	90	1.2	100	*60	15	30-60	2	6	—	—	CL, BE
	2N1554A	MO	npn,AJ,ge	90	1.2	100	*60	15	30-60	3	6	—	—	BE
	2N1555	MO	npn,AJ,ge	90	1.2	100	*80	15	30-60	3	6	—	—	CL, BE
	2N1555A	MO	npn,AJ,ge	90	1.2	100	*80	15	30-60	3	6	—	—	BE
P 60	2N1556	MO	npn,AJ,ge	90	1.2	100	*100	15	30-60	3	6	—	—	CL, BE
	2N1556A	MO	npn,AJ,ge	90	1.2	100	*100	15	30-60	3	6	—	—	BE
	2N1557	MO	npn,AJ,ge	90	1.2	100	*40	15	50-100	3	6	—	—	CL, BE
	2N1557A	MO	npn,AJ,ge	90	1.2	100	*40	15	50-100	3	6	—	—	BE
	2N1558	MO	npn,AJ,ge	90	1.2	100	*60	15	50-100	3	5	—	—	CL, BE
	2N1558A	MO	npn,AJ,ge	90	1.2	100	*60	15	50-100	3	5	—	—	BE
	2N1559	MO	npn,AJ,ge	90	1.2	100	*80	15	50-100	3	5	—	—	CL, BE
	2N1559A	MO	npn,AJ,ge	90	1.2	100	*80	15	50-100	3	5	—	—	BE
P 61	2N1560	MO	npn,AJ,ge	90	1.2	100	*100	15	50-100	3	5	—	—	CL, BE
	2N1560A	DE	npn,AJ,ge	94	1.2	100	*100	15	50-100	3	5	—	—	BE
	2N392	DE	npn,AJ,ge	94	.8	100	*60	5	—	0.065	6	—	—	BE
	2N669	DE	npn,AJ,ge	94	1.2	100	*40	3	—	0.065	10	—	—	BE
	2N1159	DE	npn,AJ,ge	94	0.8	100	*80	5	—	0.065	10	—	—	BE
	2N1160	DE	npn,AJ,ge	94	0.8	100	*80	7	—	0.065	10	—	—	BE
	2N1168	DE	npn,AJ,ge	94	0.8	100	*50	5	—	0.065	10	—	—	BE, CL
	3N49	MH	npn,AJ,ge	94	1.25	100	*60	15	30-120	3	750	—	—	
P 62	3N50	MH	npn,AJ,ge	94	1.25	100	*80	15	20-80	3	450	—	—	
	3N51	MH	npn,AJ,ge	94	1.25	100	*40	15	30-120	3	750	—	—	
	3N52	MH	npn,AJ,ge	94	1.25	100	*60	15	20-80	3	450	—	—	
	151-04	WH	npn,AJ,si	100	1.4	150	*80	6.0	*11	10ma	25	—	—	
	151-07	WH	npn,AJ,si	100	1.4	150	*140	6.0	*11	10ma	25	—	—	
	152-04	WH	npn,AJ,si	100	1.4	150	*80	6.0	*18	10ma	25	—	—	
	152-05	WH	npn,AJ,si	100	1.4	150	*100	6.0	*18	10ma	25	—	—	
	152-08	WH	npn,AJ,si	100	1.4	150	*160	6.0	*18	10ma	25	—	—	
P 63	151-05	WH	npn,AJ,si	100	1.4	150	*100	6.0	*11	10ma	25	—	—	
	151-06	WH	npn,AJ,si	100	1.4	150	*120	6.0	*11	10ma	25	—	—	
	151-08	WH	npn,AJ,si	100	1.4	150	*160	6.0	*11	10ma	25	—	—	
	151-09	WH	npn,AJ,si	100	1.4	150	*180	6.0	*11	10ma	25	—	—	
	151-10	WH	npn,AJ,si	100	1.4	150	*200	6.0	*11	10ma	25	—	—	
	152-06	WH	npn,AJ,si	100	1.4	150	*120	6.0	*18	10ma	25	—	—	
	152-07	WH	npn,AJ,si	100	1.4	150	*140	6.0	*18	10ma	25	—	—	
	152-09	WH	npn,AJ,si	100	1.4	150	*180	6.0	*18	10ma	25	—	—	
P 64	152-10	WH	npn,AJ,si	100	1.4	150	*200	6.0	*18	10ma	25	—	—	
	2N1084	TR	npn,P,L,si	5±100	.050	200	*60		*20	*10	*25,000	—	—	
	2N1085	TR	npn,ME,si	5±100	.050	200	60		*40	*15	*15,000	—	—	
	2N1157A	MH	npn,AJ,ge	100	1.43	95	*80	30	50	20	75	—	—	
	2N1206	TR	npn,ME,si	3±100	.030	200	60		15	*1	*30,000	—	—	
	2N1207	TR	npn,ME,si	3±100	.030	200	125		15	*1	*30,000	—	—	
	2N1651	BE	npn,DJ,ge	100	1.2	110	60	25	30	2.0	—	—	—	Sat. volt=1.0v
	2N1652	BE	npn,DJ,ge	100	1.2	110	100	25	30	2.0	—	—	—	Sat. volt=0.5v
P 65	2N1653	BE	npn,DJ,ge	100	1.2	110	120	25	30	2.0	—	—	—	Sat. volt=0.5v
	2N1675	WE	npn,D, ge	100	—	150	100	10	12	0.008	50mc	—	100	
	2N1936	TI	npn,MS,si	100	1.34	175	60	15	—	20	7 mc	—	—	
	2N1937	TI	npn,MS,si	100	1.34	175	80	15	—	20	7 mc	—	—	
	2N1899	PSI	npn,DM,si	125	1	150	140	10	10	20	20	10	100	hi freq., hi power
	2N1900	PSI	npn,DM,si	125	1	150	140	5	10	20	20	—	—	hi freq., hi power

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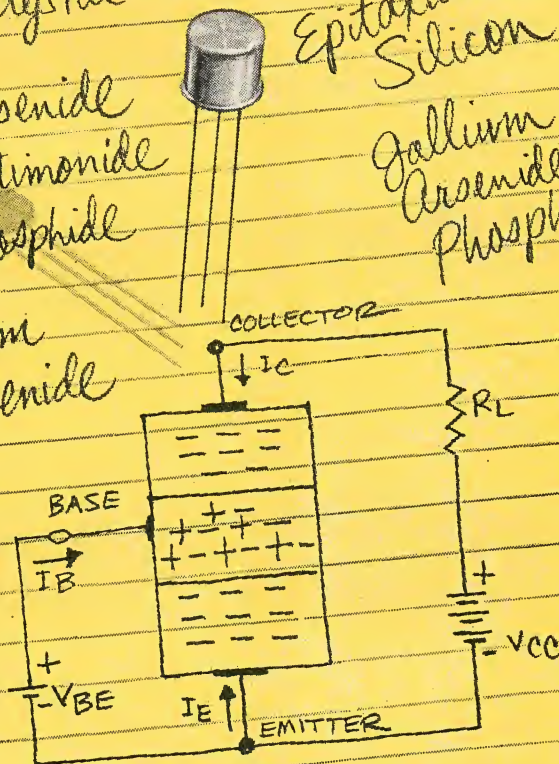
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ON READER-SERVICE CARD CIRCLE 460

P continued

Cross Index Key	Type No.	Mfr.	Type	P _c (w)	MAX. RATINGS				CHARACTERISTICS						Remarks
					w/°C	T _i (°C)	V _{CEO} V _{CBO} (v)	I _c (a)	h _{FE} *h _{FE}	I _{CO} (ma) (*μa)	f _{ae} *f _T (kc)	Pow. Gain (db)	Pow. Out. (w)		
P 64	2N1901	PSI	npn,DM,si	125	1	150	140	5	10	20	20	—	—	hi freq., hi pwr.	
	2N1902	PSI	npn,DM,si	125	1	150	140	10	10	20	20	—	—		
	2N1903	PSI	npn,DM,si	125	1	150	140	10	10	20	20	10	100		
	2N1904	PSI	npn,DM,si	125	1	150	140	10	10	20	20	—	—	hi freq., hi power	
	PT900	PSI	npn,DM,si	125	1	150	80	10	3	10	20	10	100		
	2N173	DE	pnnp,AJ,ge	150	0.5	100	*60	0.5	—	0.1	10	—	20	MO, TS, TI, RCA, SO, BE	
	2N174	DE	pnnp,AJ,ge	150	0.5	100	*80	15	—	0.1	10	—	40	TS, MO, TI, RCA, SO, BE	
P 65	2N229	WH	npn,AJ,si	150	2.0	150	*200	10	*100	10ma	30	—	—	MO, TS, TI, RCA, SO, BE	
	2N277	DE	pnnp,AJ,ge	150	0.5	100	*40	15	—	0.1	10	—	20	MO, TS, TI, RCA, BE, SO	
	2N278	DE	pnnp,AJ,ge	150	0.5	100	*50	15	—	0.1	10	—	20	MO, TS, TI, RCA, BE, SO	
	2N441	DE	pnnp,AJ,ge	150	0.5	100	*40	15	—	0.1	10	—	20	MO, TS, TI, RCA, BE	
	2N442	DE	pnnp,AJ,ge	150	0.5	100	*50	15	—	0.1	10	—	20	MO, TS, TI, RCA, BE	
	2N443	DE	pnnp,AJ,ge	150	0.5	100	*60	15	—	0.1	10	—	20	MO, TS, TI, RCA, BE	
	2N456A	CL	pnnp,A,ge	150	0.5	100	*40	7	*30-90	*0.5	*200	—	—	USA, Mil	
P 66	2N457A	CL	pnnp,A,ge	150	0.5	100	*60	7	*30-90	*0.5	*200	—	—	USA, Mil	
	2N458A	CL	pnnp,A,ge	150	0.5	100	*80	7	*30-90	*0.5	*200	—	—	USA, Mil	
	2N511	TI	pnnp,AJ,ge	150	2	100	40	25	20-60	5	—	—	—	Sat. volt=0.2v, BE	
	2N511A	TI	pnnp,AJ,ge	150	2	100	60	25	20-60	5	—	—	—	Sat. volt=0.2v, BE	
	2N511B	TI	pnnp,AJ,ge	150	2	100	80	25	20-60	5	—	—	—	BE	
	2N512	TI	pnnp,AJ,ge	150	2	100	40	25	20-60	5	—	—	—		
	2N512A	TI	pnnp,AJ,ge	150	2	100	60	25	20-60	5	—	—	—		
P 67	2N512B	TI	pnnp,AJ,ge	150	2	100	80	25	20-60	5	—	—	—	Sat. volt=0.4v	
	2N513	TI	pnnp,AJ,ge	150	2	100	40	25	20-60	5	—	—	—	Sat. volt=0.4v	
	2N513A	TI	pnnp,AJ,ge	150	2	100	60	25	20-60	5	—	—	—	Sat. volt=0.4v	
	2N513B	TI	pnnp,AJ,ge	150	2	100	80	25	20-60	5	—	—	—		
	2N514	TI	pnnp,AJ,ge	150	2	100	40	25	20-60	5	—	—	—	Sat. volt=0.5v, BE	
	2N514A	TI	pnnp,AJ,ge	150	2	100	60	25	20-60	5	—	—	—	Sat. volt=0.5v, BE	
	2N514B	TI	pnnp,AJ,ge	150	2	100	80	25	20-60	5	—	—	—	Sat. volt=0.5v, BE	
P 68	2N1015	WH	npn,AJ,si	150	1.43	150	*30	7.5	*10	10	25	—	—	STC, AMF	
	2N1015A	WH	npn,AJ,si	150	1.43	150	*60	7.5	*10	10	25	—	—	AMF	
	2N1015B	WH	npn,AJ,si	150	1.43	150	*100	7.5	*10	10	25	—	—	AMF	
	2N1015C	WH	npn,AJ,si	150	1.43	150	*150	7.5	*10	10	30	—	—	AMF	
	2N1016	AMF	npn,FJ,si	150	1.4	150	60	7.5	8	10	—	—	—		
	2N1016A	AMF	npn,FJ,si	150	1.4	150	100	7.5	8	10	—	—	—		
	2N1016B	AMF	npn,FJ,si	150	1.4	150	100	7.5	8	10	—	—	—		
P 69	2N1016D	WH	npn,AJ,si	150	1.43	150	*200	7.5	*10	10	30	—	—		
	2N1021	TI	pnnp,AJ,ge	150	2	100	*100	10	*30-90	2	—	—	—	DE, BE	
	2N1022	TI	pnnp,AJ,ge	150	2	100	*120	10	*30-90	2	—	—	—	DE, BE	
	2N1099	DE	pnnp,AJ,ge	150	0.5	100	*80	15	—	0.1	10	—	40	TS, MO, TI, RCA, SO, BE	
	2N1100	DE	pnnp,AJ,ge	150	0.5	100	*100	15	—	0.1	10	—	40	TS, MO, RCA, SO, BE	
	2N1358A	DE	pnnp,A,ge	150	0.5	110	*100	15	*25/50	4	5.0	—	—		
	2N1412USN	DE	pnnp,A,ge	150	0.5	110	*100	15	*25/50	4	5.0	—	—		
P 70	2N1907	TI	pnnp,AD,ge	150	2	100	100	20	10	10	—	—	—		
	2N1908	TI	pnnp,AD,ge	150	2	100	130	20	10	10	—	—	—	TS	
	2N1980	TI	pnnp,AJ,ge	150	2	100	*50	15	50	6	—	—	—		
	2N1981	TI	pnnp,AJ,ge	150	2	100	*70	15	50	6	—	—	—	TS	
	2N1982	TI	pnnp,AJ,si	150	2	100	*90	15	50	6	—	—	—	TS	
	2N2015	RCA	npn,si	150	—	—	100	10	10	*15	—	—	—		
	2N2016	RCA	npn,si	150	—	—	130	10	10	—	—	—	—		
P 71	2N2233	WH	npn,AJ,si	150	2.0	150	*200	10	*400	10ma	35	—	—		
	2N2226	WH	npn,F,si	150	2	150	*50	10	100	10	11	—	—		
	2N2227	WH	npn,F,si	150	2	150	*100	10	100	10	11	—	—		
	2N2228	WH	npn,F,si	150	2	150	*150	10	100	10	11	—	—		
	2N2231	WH	npn,F,si	150	2	150	*100	10	400	10	11	—	—		
	2N2230	WH	npn,F,si	150	2	150	*50	10	400	10	11	—	—		
	2N2232	WH	npn,F,si	150	2	150	*150	10	400	10	11	—	—		
P 72	2N2330	MO	npn,DDP,si	150	0.8	175	5.33	*30	—	50	0.1	—	7	Epitaxial	
	2N2331	MO	npn,DDP,si	150	0.5	175	3.33	*30	—	50	0.1	—	7	Epitaxial	
	2N2580	DE	npn,D,si	150	0.7	150	400	10	*10/40	5	50	—	—		
	2N2581	DE	npn,D,si	150	0.7	150	400	10	*25/65	5	50	—	—		
	2N2582	DE	npn,D,si	150	0.7	150	500	10	*10/40	5	50	—	—		
	2N2583	DE	npn,D,si	150	0.7	150	500	10	*25/65	5	50	—	—		
	2N2075	MO	pnnp,AJ,ge	170	2	110	80	15	25-100	4.0	10	—	—	SO	
P 73	2N2075A	MO	pnnp,AJ,ge	170	2	110	80	15	25-100	4.0	10	—	—	"Meg-A-Life"	
	2N2076	MO	pnnp,AJ,ge	170	2	110	70	15	25-100	4.0	10	—	—	SO, "Meg-A-Life"	
	2N2077	MO	pnnp,AJ,ge	170	2	110	50	15	25-100	4.0	10	—	—	SO, "Meg-A-Life"	
	2N2078	MO	pnnp,AJ,ge	170	2	110	40	15	25-100	4.0	10	—	—	SO, "Meg-A-Life"	
	2N2079	MO	pnnp,AJ,ge	170	2	110	80	15	40-160	4.0	10	—	—	SO, "Meg-A-Life"	
	2N2080	MO	pnnp,AJ,ge	170	2	110	70	15	40-160	4.0	10	—	—	SO, "Meg-A-Life"	
	2N2081	MO	pnnp,AJ,ge	170	2	110	50	15	40-160	4.0	10	—	—	SO, "Meg-A-Life"	

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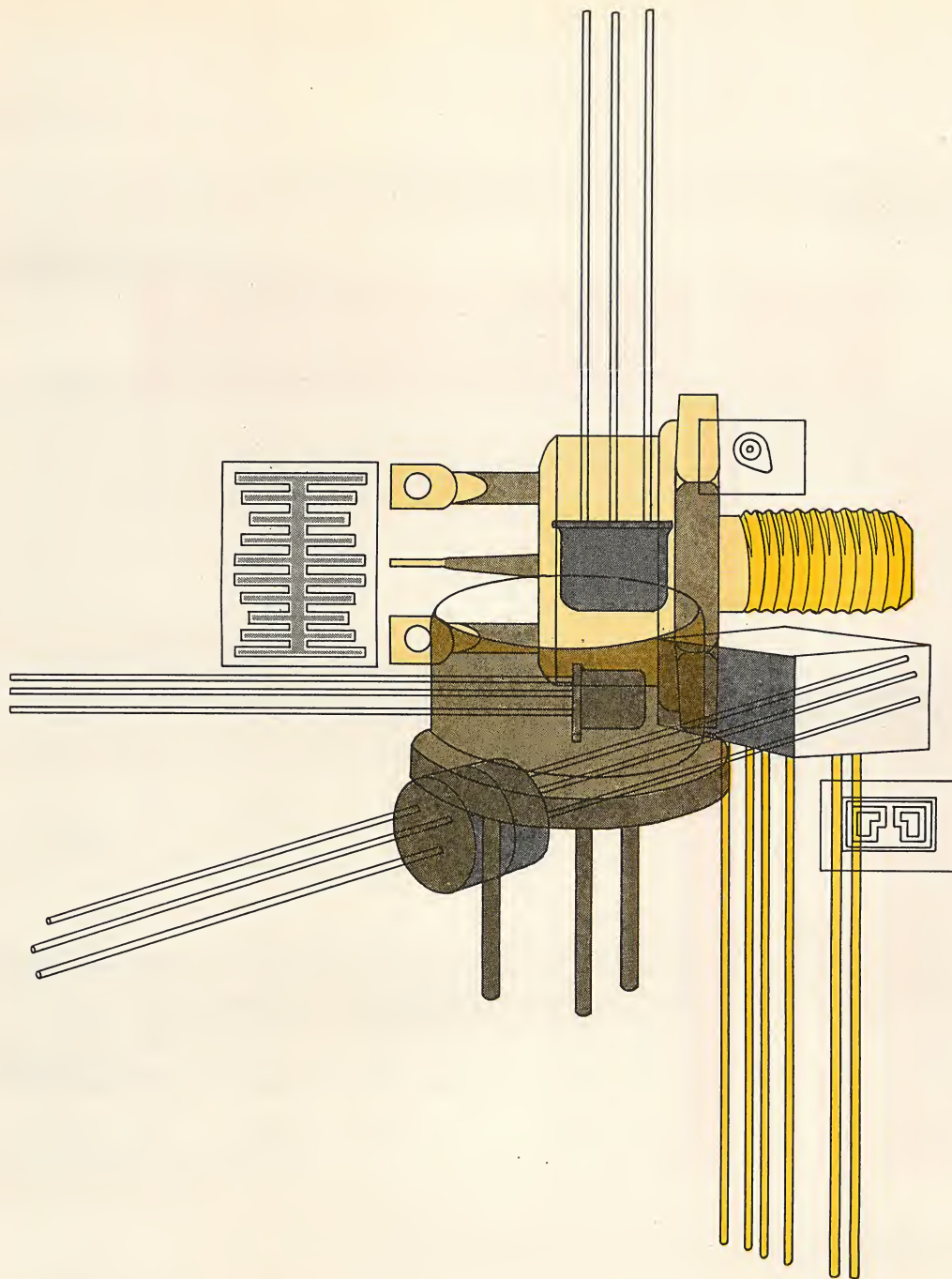


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P continued

Cross Index Key	Type No.	Mfr.	Type	P _c (w)	MAX. RATINGS			CHARACTERISTICS						Remarks
					w/°C	T _i (°C)	V _{CEO} *V _{CBO} (v)	I _c (a)	h _{FE} *h _{FE}	I _{CO} (ma) (*μa)	f _{ae} *f _T (K)	Power Gain (db)	Power Out. (w)	
P 71	2N2082	MO	npn,AJ,ge	170	2	110	*40	15	*70	4	10	—	—	SO, "Meg-A-Life" "Meg-A-Life" SO, "Meg-A-Life"
	2N2082A	MO	npn,AJ,ge	170	2	110	*40	15	*70	4	10	—	—	
	2N2152	MO	npn,AJ,ge	170	2	110	45	30	50-100	4.0	2.7	—	—	
	2N2152A	MO	npn,AJ,ge	170	2	110	45	30	50-100	4.0	2.7	—	—	
	2N2153	MO	npn,AJ,ge	170	2	110	60	30	50-100	4.0	2.7	—	—	
	2N2154	MO	npn,AJ,ge	170	2	110	75	30	50-100	4.0	2.7	—	—	SO, "Meg-A-Life"
	2N2155	MO	npn,AJ,ge	170	2	110	90	30	50-100	4.0	2.7	—	—	SO
	2N2156	MO	npn,AJ,ge	170	2	110	45	30	80-160	4.0	2.7	—	—	SO, "Meg-A-Life"
2N2157	MO	npn,AJ,ge	170	2	110	60	30	80-160	4.0	2.7	—	—	SO, "Meg-A-Life"	
2N2158	MO	npn,AJ,ge	170	2	110	75	30	10-160	4.0	2.7	—	—	SO, "Meg-A-Life"	
P 72	2N2490	MO	npn,AJ,ge	170	2	110	*70	15	*20-40	3	10	—	—	"Meg-A-Life" "Meg-A-Life" "Meg-A-Life" "Meg-A-Life"
	2N2491	MO	npn,AJ,ge	170	2	110	*60	15	*25-50	3	10	—	—	
	2N2492	MO	npn,AJ,ge	170	2	110	*80	15	*25-50	2	10	—	—	
	2N2493	MO	npn,AJ,ge	170	2	110	*100	15	*25-50	3	10	—	—	
	2N2728	MO	npn,AJ,ge	170	2	110	*15	50	*40-130	*30	—	—	—	
	MP500	MO	npn,AJ,ge	170	2	110	45	60	30-60	4.0	3.6	—	—	
	MP500A	MO	npn,AJ,ge	170	2	110	45	60	30-60	4.0	3.6	—	—	
	MP501	MO	npn,AJ,ge	170	2	110	60	60	30-60	4.0	3.6	—	—	
MP502	MO	npn,AJ,ge	170	2	110	75	60	30-60	4.0	3.6	—	—		
MP504	MO	npn,AJ,ge	170	2	110	45	60	50-100	4.0	3.6	—	—		
P 73	MP505	MO	npn,AJ,ge	170	2	110	60	60	50-100	4.0	3.6	—	—	"Meg-A-Life"
	MP506	MO	npn,AJ,ge	170	2	110	75	60	50-100	4.0	3.6	—	—	"Meg-A-Life"
	2N574	MH	npn,AJ,ge	187	2.5	100	*60	10	9-22	7	100	—	—	USA
	2N574A	MH	npn,AJ,ge	187	2.5	100	*80	10	9-22	20	100	—	—	USA
	2N575	MH	npn,AJ,ge	187	2.5	100	*60	25	19-42	7	150	—	—	
	2N575A	MH	npn,AJ,ge	187	2.5	100	*80	25	19-42	20	150	—	—	—
	2N1157	MH	npn,AJ,ge	187	2.5	100	*60	40	38-84	7	200	—	—	
	DA3F3	MH	npn,AJ,ge	187	2.5	100	*60	25	35	20	175	—	—	
	2N2739	WH	npn,AJ,si	200	2.0	175	*50	20	*10	15ma	14	—	—	
	2N2740	WH	npn,AJ,si	200	2.0	175	*200	20	*10	15ma	14	—	—	
P 74	2N2741	WH	npn,AJ,si	200	2.0	175	*150	20	*10	15ma	14	—	—	—
	2N2742	WH	npn,AJ,si	200	2.0	175	*200	20	*10	15ma	14	—	—	
	2N2745	WH	npn,AJ,si	200	2.0	175	*50	20	*10	15ma	14.5	—	—	
	2N2746	WH	npn,AJ,si	200	2.0	175	*100	20	*10	15ma	14.5	—	—	
	2N2747	WH	npn,AJ,si	200	2.0	175	*150	20	*10	15ma	14.5	—	—	
	2N2748	WH	npn,AJ,si	200	2.0	175	*200	20	*10	15ma	14.5	—	—	
	2N2751	WH	npn,AJ,si	200	2.0	175	*50	20	*10	15ma	16	—	—	
	2N2752	WH	npn,AJ,si	200	2.0	175	*100	20	*10	15ma	16	—	—	
	2N2753	WH	npn,AJ,si	200	2.0	175	*150	20	*10	15ma	16	—	—	
	2N2754	WH	npn,AJ,si	200	2.0	175	*200	20	*10	15ma	16	—	—	
P 75	2N2757	WH	npn,AJ,si	200	2.0	175	*50	30	*10	15ma	14	—	—	—
	2N2758	WH	npn,AJ,si	200	2.0	175	*100	30	*10	15ma	14	—	—	
	2N2759	WH	npn,AJ,si	200	2.0	175	*150	30	*10	15ma	14	—	—	
	2N2760	WH	npn,AJ,si	200	2.0	175	*200	30	*10	15ma	14	—	—	
	2N2761	WH	npn,AJ,si	200	2.0	175	*250	30	*10	15ma	14	—	—	
	2N2763	WH	npn,AJ,si	200	2.0	175	*50	30	*10	15ma	14.5	—	—	
	2N2764	WH	npn,AJ,si	200	2.0	175	*100	30	*10	15ma	14.5	—	—	
	2N2765	WH	npn,AJ,si	200	2.0	175	*150	30	*10	15ma	14.5	—	—	
	2N2766	WH	npn,AJ,si	200	2.0	175	*200	30	*10	15ma	14.5	—	—	
	2N2769	WH	npn,AJ,si	200	2.0	175	*50	30	*10	15ma	16	—	—	
P 76	2N2771	WH	npn,AJ,si	200	2.0	175	*150	30	*10	15ma	16	—	—	—
	2N2772	WH	npn,AJ,si	200	2.0	175	*200	30	*10	15ma	16	—	—	
	2N2776	WH	npn,AJ,si	200	2.0	175	*100	30	*10	15ma	16	—	—	
	2N1809	WH	npn,AJ,si	250	2.22	175	*50	30	10	15	17	—	—	
	2N1810	WH	npn,AJ,si	250	2.22	175	*100	30	10	15	17	—	—	
	2N1811	WH	npn,AJ,si	250	2.22	175	*150	30	10	15	17	—	—	
	2N1812	WH	npn,AJ,si	250	2.22	175	*200	30	10	15	17	—	—	
	2N1813	WH	npn,FJ,si	250	2.22	175	*250	30	10	15	—	—	—	
2N1814	WH	npn,FJ,si	250	2.22	175	*300	30	10	15	—	—	—		
2N1816	WH	npn,AJ,si	250	2.22	175	*50	30	10	15	18	—	—		
P 77	2N1817	WH	npn,AJ,si	250	2.22	175	*100	30	10	15	18	—	—	—
	2N1818	WH	npn,AJ,si	250	2.22	175	*150	30	10	15	18	—	—	
	2N1819	WH	npn,AJ,si	250	2.22	175	*200	30	10	15	18	—	—	
	2N1823	WH	npn,AJ,si	250	2.22	175	*50	30	10	15	19	—	—	
	2N1824	WH	npn,AJ,si	250	2.22	175	*100	30	10	15	19	—	—	
	2N1825	WH	npn,AJ,si	250	2.22	175	*150	30	10	15	19	—	—	
	2N1826	WH	npn,AJ,si	250	2.22	175	*200	30	10	15	19	—	—	
	2N1830	WH	npn,AJ,si	250	2.22	175	*50	30	*10	5ma	14	—	—	
	2N1831	WH	npn,AJ,si	250	2.22	175	*100	30	*10	5ma	14	—	—	
	2N1832	WH	npn,AJ,si	250	2.22	175	*150	30	*10	5ma	14	—	—	



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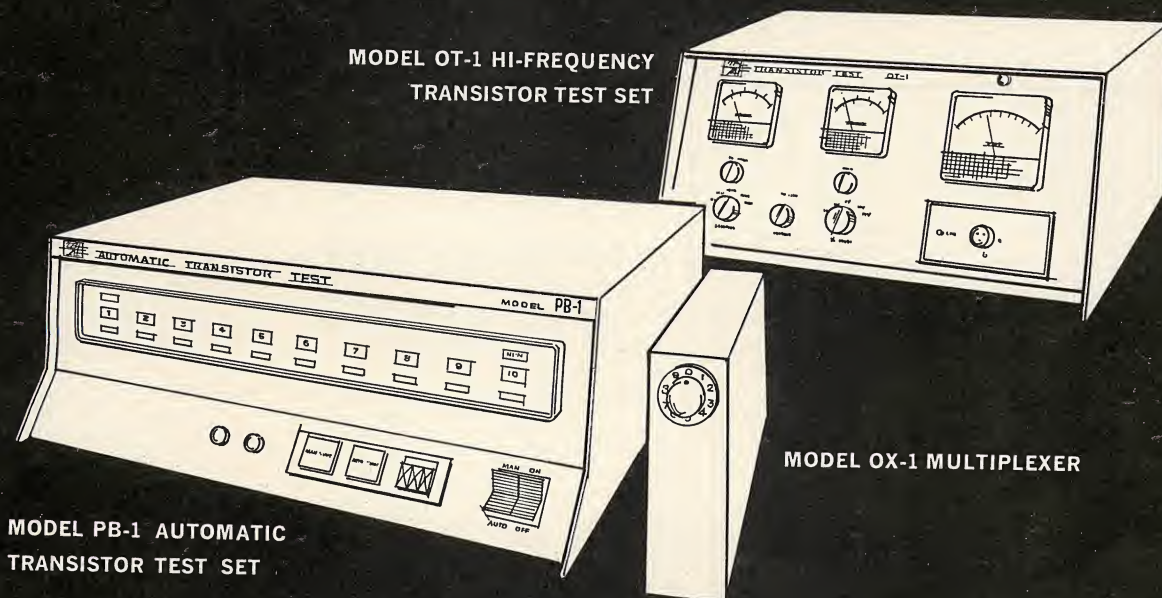
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P *continued*

Cross Index Key	Type No.	Mfr.	Type	P _c (w)	MAX. RATINGS				CHARACTERISTICS					Remarks
					w/°C	T _i (°C)	V _{CEO} *V _{CBO} (v)	I _c (a)	h _{fe} *h _{FE}	I _{CO} (ma) *I _{μa}	f _{ae} *f _T (kc)	Powr. Gain (db)	Powr. Out. (w)	
P 78	2N1833	WH	npn, AJ, si	250	2.22	175	*200	30	*10	5ma	14	—	—	
	2N2109	WH	npn, FJ, si	250	2.22	175	*50	30	10	15	14	—	—	
	2N2110	WH	npn, FJ, si	250	2.22	175	*100	30	10	15	14	—	—	
	2N2111	WH	npn, FJ, si	250	2.22	175	*150	30	10	15	14	—	—	
	2N2112	WH	npn, FJ, si	250	2.22	175	*200	30	10	15	14	—	—	
	2N2113	WH	npn, FJ, si	250	2.22	175	*250	30	10	15	—	—	—	
	2N2114	WH	npn, FJ, si	250	2.22	175	*300	30	10	15	—	—	—	
	2N2116	WH	npn, FJ, si	250	2.22	175	*50	30	10	15	14.5	—	—	
	2N2117	WH	npn, FJ, si	250	2.22	175	*100	30	10	15	14.5	—	—	
	2N2118	WH	npn, FJ, si	250	2.22	175	*150	30	10	15	14.5	—	—	
P 79	2N2119	WH	npn, FJ, si	250	2.22	175	*200	30	10	15	14.5	—	—	
	2N2123	WH	npn, FJ, si	250	2.22	175	*50	30	10	15	16	—	—	
	2N2124	WH	npn, FJ, si	250	2.22	175	*100	30	10	15	16	—	—	
	2N2125	WH	npn, FJ, si	250	2.22	175	*150	30	10	15	16	—	—	
	2N2126	WH	npn, FJ, si	250	2.22	175	*200	30	10	15	16	—	—	
	2N2130	WH	npn, AJ, si	250	2.22	175	*50	30	*10	5ma	14	—	—	
	2N2131	WH	npn, AJ, si	250	2.22	175	*100	30	*10	5ma	14	—	—	
	2N2132	WH	npn, AJ, si	250	2.22	175	*150	30	*10	5ma	14	—	—	
	2N2133	WH	npn, AJ, si	250	2.22	175	*200	30	*10	5ma	14	—	—	
	2N1620	TR	npn	—	0.4	200°C	*100	5	8	10	800	—	60	
P 80	2N2032	TR	npn	—	0.9	200°C	*45	5	12	—	1200	—	45	*at 200mc *at 100mc
	SN-101	CS	npn, MS, si	—	8.7	200	—	140	1	40	0.5	—	*3	
	SN-102	CS	npn, MS, si	—	8.7	200	—	120	1	40	0.5	—	*5	
	ST5060	TR	npn	—	0.025	200	40	—	9-36	0.005	—	—	—	
	ST5061	TR	npn	—	0.025	200	70	—	9-36	0.005	—	—	—	
	ST6510	TR	npn	—	0.088	200	20	—	20min	0.005	10K	—	—	
	ST6511	TR	npn	—	0.088	200	*40	—	20-60	0.005	10K	—	—	
	ST6512	TR	npn	—	0.088	200	*40	—	40-120	0.005	10K	—	—	
	2N914	GE	npn, si	—	360	200	—	40	—	3.0	25mμ	—	6.0	
	2N916	GE	npn, si	—	360	200	—	45	—	3.0	10mμ	—	6.0	
P 81	2N2192	GE	npn, si	—	0.8	200	—	60	1.0amp	2.5	10mμ	—	20	Planar Epitaxial, RA Planar Epitaxial, RA Planar Epitaxial, RA Planar Epitaxial, RA Planar Epitaxial, RA
	2N2192A	GE	npn, si	—	0.8	200	—	60	1.0amp	2.5	10mμ	—	20	
	2N2193	GE	npn, si	—	0.8	200	—	80	1.0amp	2.5	10mμ	—	20	
	2N2193A	GE	npn, si	—	0.8	200	—	80	1.0amp	2.5	10mμ	—	20	
	2N2194	GE	npn, si	—	0.8	200	—	60	1.0amp	2.5	10mμ	—	20	
	2N2194A	GE	npn, si	—	0.8	200	—	60	1.0amp	2.5	10mμ	—	20	
	2N2195	GE	npn, si	—	0.6	200	—	45	1.0amp	2.5	100mμ	—	20	
		GE	npn, si	—	0.6	200	—	45	1.0amp	2.5	100mμ	—	20	

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May 24, 1963

T61

LOW LEVEL SWITCHING

Generally types rated under one watt. In order of f_{ae} (f_{ab} or f_T where noted).

Cross Index Key	Type No.	Mfr.	Type	f_{ae} * f_T ** f_{ab} (mc)	MAX. RATINGS				CHARACTERISTICS				SWITCHING			Remarks
					P_c (mw)	T_i (°C)	$mW/°C$	V_{CEO} * V_{CBO} (v)	I_C (ma)	h_{fe} * h_{FE}	I_{CO} (μa)	C_{oe} * C_{ob} (pf)	t_r (μsec) * t_{on} (nsec)	t_s (μsec) * t_{off} (nsec)	$V_{ce(sat)}$ (v)	
LL 1	2N1034	RA	npn,FA,si	0.2	250	160	—	*40	50	15	5	70	—	—	—	SSD, NA, KF
	2N1275	RA	npn,FA,si	0.2	250	160	.54	80	100	15	.005	60	—	—	—	KF
	2N1037	RA	npn,FA,ge	0.25	250	160	—	*35	50	30	5	70	—	—	—	SSD, NA, KF
	2N329A	CT	npn,AJ,si	0.3	250	160	3	35	50	28	.005	70	—	—	—	SSD, NA, KF, AMP
	2N1035	RA	npn,FA,si	0.3	250	160	—	*35	50	30	5	70	—	—	—	
LL 2	2N1036	RA	npn,FA,si	0.4	250	160	—	*30	50	60	5	70	—	—	—	SSD, NA, KF
	2N1640	CT	npn,AJ,si	0.4	250	160	2	20	50	11	.001	50	—	—	—	KF
	C301	CT	npn,AJ,si	0.4	250	160	2	70	50	4	5	50	—	—	—	KF
	2N328A	CT	npn,AJ,si	0.5	250	160	3	30	50	60	.005	70	—	—	—	KF, RA
	2N329A	SSD	npn,AJ,si	**0.5	385	160	2.85	30	50	*88	0.1	70	—	—	—	
	2N1057	GE	npn,AJ,ge	0.5	240	100	4	45	300	—	300	40	—	—	0.08	RA, KF, SD
	2N327A	WT	npn,AJ,si	0.7	—	200	3	.3	200	15	100	70	—	—	—	Pulse Amp.
	2N670	PH	npn,AJ,ge	0.7	300	85	5.0	40	2a	200	20	—	—	—	0.3	TO-5 Package, KF
	2N2670	PH	npn,AJ,ge	**0.7	300	85	—	*40	2a	*100	20	—	—	—	—	
	2N1234	HU	npn,AJ,si	0.8	400	160	3	110	100	21	0.1	95	—	—	—	
LL 3	2N1244	HU	npn,AJ,si	0.8	1000	160	7.4	110	200	20	0.1	95	—	—	—	Coaxial package
	2N1641	CT	npn,AJ,si	0.8	250	160	2	10	50	15	.001	50	—	—	—	
	C302	CT	npn,AJ,si	0.8	250	160	2	8	50	12	.2	50	—	—	—	RA, SSD, KF
	2N327A	HU	npn,AJ,si	1.0	385	160	3	50	100	14	0.1	95	—	—	—	WT, RA, SSD, JA, KF
	2N328A	HU	npn,AJ,si	1.0	385	160	3	50	100	25	0.1	95	—	—	—	
	2N329A	HU	npn,AJ,si	1.0	385	160	3	50	100	50	10	95	—	—	—	WT, RA, SSD, NA, KF
	2N331	RCA	npn,AJ,ge	1.0	200	85	3	*30	200	—	16	—	—	—	0.09	BE, US, MO
	2N1056	GE	npn,AJ,ge	1.0	240	100	4	50	300	25	25	40	—	—	—	Neon indicator
	2N2370	NA	npn,si	1.0	200	200	1.4	15	50	15	0.005	15	—	—	—	2.5db NF
	2N2371	NA	npn,si	1.0	200	200	1.4	15	50	20	0.005	15	—	—	—	2.5 db NF
LL 4	2N2372	NA	npn,si	1.0	150	200	0.86	15	50	15	0.005	15	—	—	—	2.5 db NF
	2N2373	NA	npn,si	1.0	150	200	0.86	15	50	20	0.005	15	—	—	—	
	TS605	TS	npn,AJ,ge	**1.0	150	100	—	12	400	*15	10	—	—	—	—	
	TS606	TS	npn,AJ,ge	**1.0	150	100	—	20	400	*15	10	—	—	—	—	WT, KF, SSD
	2N1228	HU	npn,AJ,si	1.2	400	160	3	*15	100	20	0.1	95	—	—	—	
	2N1229	HU	npn,AJ,si	1.2	400	160	3	15	100	36	0.1	95	—	—	—	WT, NA, KF, AMP, SSD
	2N1230	HU	npn,FJ,si	1.2	400	200	—	*35	500	14	0.1	100	—	—	—	WT, NA, KF, SSD, AMP
	2N1231	HU	npn,FJ,si	1.2	400	200	—	*35	500	24	0.1	100	—	—	—	WT, NA, KF, SSD, AMP
	2N1232	HU	npn,FJ,si	1.2	400	200	—	65	500	14	0.1	100	—	—	—	WT, NA, KF, SSD, AMP
	2N1233	HU	npn,FJ,si	1.2	400	200	—	65	500	24	0.1	100	—	—	—	
LL 5	2N1234	HU	npn,FJ,si	1.2	400	200	—	110	500	14	0.1	100	—	—	—	WT, NA, KF, SSD
	2N1238	HU	npn,AJ,si	1.2	1000	160	7.4	15	200	20	0.1	95	—	—	—	Coaxial package
	2N1239	HU	npn,AJ,si	1.2	1000	160	7.4	15	200	36	0.1	95	—	—	—	Coaxial package
	2N1240	HU	npn,AJ,si	1.2	1000	160	7.4	35	200	20	0.1	95	—	—	—	Coaxial package
	2N1241	HU	npn,AJ,si	1.2	1000	160	7.4	35	200	36	0.1	95	—	—	—	Coaxial package
	2N1242	HU	npn,AJ,si	1.2	1000	160	7.4	60	200	20	0.1	95	—	—	—	Coaxial package
	2N1243	HU	npn,AJ,si	1.2	1000	160	7.4	60	200	36	0.1	95	—	—	—	Coaxial package
	2N1642	CT	npn,AJ,si	1.2	250	160	2	6	50	23	.005	—	—	—	—	Field effect
	C106	CT	npn,AJ,si	1.2	250	160	2	10	50	50	50	—	—	—	—	
	OC122	AMP	npn,AJ,ge	1.3	300	90	4.5	*32	500	180	—	—	—	—	—	
LL 6	2N312	SY	npn,AJ,ge	1.5	100	85	1.66	15	200	—	15	—	1.5	2	0.075	US, KF, TI
	2N519	IND	npn,AJ,ge	1.5	150	85	2.5	15	200	25	1	14	1.3	0.7	—	US, KF
	2N519A	IND	npn,AJ,ge	1.5	150	85	2.5	25	200	25	1	14	1.3	0.7	—	
	B1154	BE	npn,AJ,ge	1.5	400	100	.15	40	300	—	10	20	1.5	—	.25	
	B1154A	BE	npn,AJ,ge	1.5	400	100	.15	60	300	—	15	20	1.5	—	.25	
	OC123	AMP	npn,AJ,ge	1.5	300	90	4.5	*50	500	160	—	—	—	—	—	
	2N328A	SSD	npn,FA,si	2	385	160	2.85	40	50	30	5	70	—	—	—	KF
	2N536	PH	npn,AJ,ge	**2	50	85	—	*20	30	5.0	4.0	—	—	—	0.07	
	2N679	SY	npn,AJ,ge	2	150	85	2.5	20	200	—	25	—	5	5	0.3	
	2N1220	SSD	npn,AJ,si	**2	250	175	1.7	25	100	*9	0.1	18	—	—	—	
LL 7	2N1222	SSD	npn,AJ,si	**2	250	175	1.7	25	100	10	.005	*18	—	—	—	—
	2N1223	SSD	npn,AJ,si	**2	250	175	1.7	40	100	6	0.1	15	—	—	—	—
	2N1446	IND	npn,AJ,ge	2	200	85	3.33	45	400	30	5	—	—	—	—	—
	OC80	AMP	npn,PADT,ge	2	550	75	—	*32	600	85	10	—	—	—	—	—
	2N438	SY	npn,AJ,ge	2.5	100	85	1.6	30	—	20	10	—	0.7	—	—	—
	2N817	RA	npn,AJ,ge	2.5	75	85	1.25	30	400	20	10	20	—	—	—	Submin
	2N818	RA	npn,AJ,ge	2.5	75	85	1.25	30	400	20	10	20	—	—	—	Submin
	2N356	SY	npn,AJ,ge	3	100	85	1.6	20	500	—	25	—	1.0	0.3	0.6	GI
	2N356A	GI	npn,AJ,ge	3	150	100	2	30	500	—	3	14	1.5	0.3	0.18	SY, TI
	2N520	KF	npn,AJ,ge	3	150	100	2	20	—	20(min)	25	—	—	—	—	TI

LL continued

Cross Index Key	Type No.	Mfr.	Type	f_{ae} * f_T ** f_{ab} (mc)	MAX. RATINGS				CHARACTERISTICS				SWITCHING			Remarks
					P_c (mw)	T_j (°C)	$m_w/°C$	V_{CEO} * V_{CBO} (v)	I_C (ma)	h_{fe} * h_{FE}	I_{CO} (μ a)	C_{ob} * C_{ob} (pf)	t_r (μ sec) * t_{on} (nsec)	t_s (μ sec) * t_{off} (nsec)	$V_{ce(sat)}$ (v)	
LL 8	2N801	RA	pn-p, A, ge	3	75	85	1.25	30	400	30	4	20	—	—	—	Submin Submin
	2N802	RA	pn-p, A, ge	3	75	85	1.25	30	400	30	4	20	—	—	—	—
	2N1051	WE	pn-p, D, si	**3	250	150	4.0	40	100	30	0.1	7.0	—	—	—	—
	2N1302	IND	pn-p, A, ge	3	150	—	—	25	300	*20	6	*20	—	—	0.4	—
	2N1447	IND	pn-p, A, ge	3	200	85	3.33	45	400	45	5	—	—	—	—	—
	2N1993	TI	pn-p, A, ge	**3	300	100	4.0	*30	300	*120	4	*13	0.2	0.7	0.07	—
LL 9	2N1353	IND	pn-p, A, ge	3.5	200	85	3.33	15	200	70	2.5	12	.6	.4	0.1	KF, US
	2N1354	SY	pn-p, A, ge	4	150	100	2	40	200	30-110	40	—	—	—	—	GI, TI
	2N1404	RCA	pn-p, A, ge	4	150	100	—	40	150	30	5	20	—	—	—	GI, IND, TS, KF, TI
	2N1425	SY	pn-p, A, ge	4	150	85	2.5	20	400	—	2.0	14	1.0	0.3	0.2	RA, IND, TS, US, KF, GI
	2N1799	RA	pn-p, A, ge	4	75	85	1.25	25	150	30	5	20	—	—	—	Submin
	2N1800	RA	pn-p, A, ge	4	75	85	1.25	25	150	20	5	20	—	—	—	Submin
LL 10	2N824	RA	pn-p, A, ge	4	75	85	1.25	25	100	40	5	20	—	—	—	Submin
	2N1027	SSD	pn-p, A, si	**4	250	176	1.7	*18	100	18	.025	7	—	—	—	NA, SSD, KF
	2N1028	SSD	pn-p, A, si	**4	250	175	1.7	*10	100	9	.025	7	—	—	—	NA, KF
	2N1404	TI	pn-p, A, ge	**4	300	100	4.0	*25	300	*90	3	*13	0.18	0.8	0.08	—
	2N1448	IND	pn-p, A, ge	4	200	85	3.33	45	400	65	5	—	—	—	—	GI, RCA
	2N1606A	SY	pn-p, A, ge	4	200	100	2.6	40	200	40	10	20	—	—	—	—
LL 11	2N1780	SY	pn-p, A, ge	4	100	100	1.3	25	100	30-110	10	20	—	—	—	—
	2N1781	SY	pn-p, A, ge	4	100	100	1.3	25	100	40	5	20	—	—	—	—
	2N1808	TI	pn-p, A, ge	**4	300	85	5.0	*25	300	*120	3	*13	0.2	0.7	0.07	TI, KF, PH
	2N2000	TI	pn-p, A, ge	4	300	100	4	50	750	*100	8	30	—	0.5	—	US, KF, PH
	2N395	GE	pn-p, A, ge	**4.5	500	100	6.67	*30	200	40	1	14	—	—	—	US, KF, TI
	2N520	IND	pn-p, A, ge	4.5	150	85	2.5	15	200	100	1	14	0.9	0.7	—	—
LL 12	2N520A	IND	pn-p, A, ge	4.5	150	85	2.5	25	200	100	1	14	—	—	—	—
	2N1169	SY	pn-p, A, ge	4.5	120	85	2	25	400	20	50	20	—	—	—	RCA
	2N1170	SY	pn-p, A, ge	4.5	120	85	2	25	400	20	50	20	—	—	—	TO-5, SY, GI, RCA
	2N1302	TI	pn-p, A, ge	4.5	150	85	2.5	25	300	—	3	11	.70	.50	.1v	GI, KF, AMP
	2N1303	TI	pn-p, A, ge	4.5	150	85	2.5	*30	300	—	3	16	.40	.90	.1v	—
	2N1354	IND	pn-p, A, ge	4.5	200	85	3.33	30	200	70	2.5	12	.55	.5	0.1	KF, US
LL 13	2N123	SY	pn-p, A, ge	5	100	85	1.66	15	125	30-150	0.6	—	—	—	0.2	KF, IND, US
	2N315	GI	pn-p, A, ge	5	100	85	2	*20	500	70	1	14	1.0	0.2	0.12	IND, US, KF
	2N315A	RCA	pn-p, A, ge	5	150	100	2	*40	200	*30	5	20	1	0.7	—	—
	2N368A	SY	pn-p, A, ge	5	150	100	—	30	200	30-150	6	—	—	—	—	TS, KF, GE, GI, RCA
	2N396A	SY	pn-p, A, ge	5	150	100	2	30	200	30-90	5	—	—	—	—	KF, GI, US, TS
	2N414	SY	pn-p, A, ge	5	150	85	2.5	*30	200	30-90	5	—	0.5	0.7	0.25	—
LL 14	2N439	GE	pn-p, A, ge	5	100	85	1.66	*20	—	—	10	—	—	—	—	—
	2N450	SY	pn-p, A, ge	5	150	85	2.5	12	125	—	6	20	—	—	0.2	—
	2N576	SY	pn-p, A, ge	5	200	100	2.6	20	400	—	20	—	2	1	0.4	—
	2N578	RCA	pn-p, A, ge	5	120	71	—	20	400	15	**3	—	0.85	0.33	0.2	IND, US, KF, GI
	2N585	RCA	pn-p, A, ge	5	120	71	—	25	200	40	3	—	0.35	0.25	0.1	SY, GI, TI
	2N658	RCA	pn-p, F, A, ge	5	150	85	—	1a	1a	40	2.5	12	—	—	0.25	KF
LL 15	2N803	RA	pn-p, A, ge	5	75	85	1.25	30	400	40	4	20	—	—	—	Submin
	2N804	RA	pn-p, A, ge	5	75	85	1.25	30	400	60	10	20	—	—	—	Submin
	2N815	RA	pn-p, A, ge	5	75	85	1.25	25	200	60	10	20	—	—	—	Submin
	2N816	RA	pn-p, A, ge	5	75	85	1.25	25	200	60	10	20	—	—	—	Submin
	2N819	RA	pn-p, A, ge	5	75	85	1.25	30	400	30	10	20	—	—	—	Submin
	2N820	RA	pn-p, A, ge	5	75	85	1.25	30	400	30	10	20	—	—	—	Submin
LL 16	2N825	RA	pn-p, A, ge	5	75	85	1.25	30	200	30	6	20	—	—	—	Submin
	2N826	RA	pn-p, A, ge	5	75	85	1.25	30	200	30	6	20	—	—	—	Submin
	2N1012	GI	pn-p, A, ge	5	150	100	2	*40	—	—	5	—	0.1	0.1	0.1	KF, TI
	2N1219	SSD	pn-p, A, si	**5	250	175	1.7	25	100	*18	0.1	15	—	—	—	—
	2N1221	SSD	pn-p, A, si	**5	250	175	1.7	25	100	20	.005	*15	—	—	—	—
	2N1348	IND	pn-p, A, ge	5	200	85	3.33	40	400	95	5	12	—	—	—	—
LL 17	2N1449	IND	pn-p, A, ge	5	200	85	3.33	45	400	80	5	—	—	—	—	—
	2N1994	TI	pn-p, A, ge	5	150	85	2.5	30	300	—	5	11	1.1	1.5	—	—
	GT1658	GI	pn-p, A, ge	5	150	100	2	*30	300	50	3	10	—	—	—	—
	KGS1005	KF	pn-p, A, ge	5	200	85	5.2	30	400	40	12	—	—	—	—	—
	2N357	SY	pn-p, A, ge	6	100	85	1.6	*15	500	—	25	—	—	—	—	—
	2N357A	GI	pn-p, A, ge	6	150	100	2	30	500	90	3	14	0.5	0.5	0.18	GI, TI
LL 18	2N377	SY	pn-p, A, ge	6	150	100	2	*20	200	—	10	—	2.5	0.7	—	GE, GI, TI
	2N426	SY	pn-p, A, ge	6	150	85	2.5	*20	200	15	2	14	1.0	0.3	0.22	RA, TS, GI, US, TI, KF
	2N789	RA	pn-p, DB, si	6	—	—	1.4	45	25	15	.002	5	—	—	—	Submin
	2N902	RCA	pn-p, DB, si	6	—	—	—	45	25	15	.002	5	—	—	—	TI
	2N1319	IND	pn-p, A, ge	6	120	71	—	20	200	30	2.5	—	20	—	—	—
	2N1343	IND	pn-p, A, ge	6	150	85	2.5	20	400	40	3	12	1.0	—	—	—
LL 19	2N1997	PH	pn-p, A, ge	6	250	100	3.3	45	—	4	15	—	—	—	—	—
	2N2181	PH	pn-p, SAT, si	*6	150	140	1.3	*25	50	10	0.01	*12	—	—	—	—
	2N2182	PH	pn-p, SAT, si	*6	150	140	1.3	*25	50	10	0.01	*12	—	—	—	—
	2N2183	PH	pn-p, SAT, si	*6	150	140	1.3	*15	50	10	0.01	*12	—	—	—	—
	2N2183	PH	pn-p, SAT, si	*6	150	140	1.3	*15	50	10	0.01	*12	—	—	—	—
	2N2183	PH	pn-p, SAT, si	*6	150	140	1.3	*15	50	10	0.01	*12	—	—	—	—

600 mc f_T Switches...

120V V_{CB} Core Drivers...

100 mc Amplifier...

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PHILCO SILICON PLANAR RELIABILITY

Philco's versatile line of Epitaxial Silicon Planar NPN Transistors enables you to upgrade reliability in transistor applications.

ULTRA HIGH SPEED SWITCHES

TYPE*	Maximum Ratings			Characteristics							
	T_S °C.	V_{CB} volts	P_T @25°C. mw	I_{CBO} max. μ a	h_{FE} min.	$V_{CE(SAT)}$ max. volts	f_T min. mc	C_{ob} max. pf	t_s max. nsec	t_{on} max. nsec	t_{off} max. nsec
2N709	300	15	300	0.05	20	0.30	600	3	6	15	15
T-2877	300	15	300	0.05	20	0.30	500	3	8	17	17

*TO-18 case—collector internally connected to case.

CORE DRIVERS/PULSE AMPLIFIERS

TYPE*	V_{CB} max. volts	f_T @ 50 ma mc	h_{FE} @ 150 ma
2N1893	120	50	40
2N1613	75	60	40

*TO-5 case—collector internally connected to case.

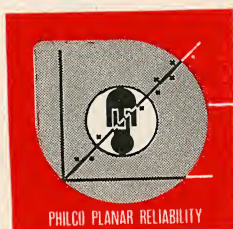
100 mc LOW-NOISE AMPLIFIER

Industry's Newest Silicon Amplifier Standard

TYPE	Power Gain	Maximum Noise Figure	Minimum BV_{CEO}
T-2857*	15-22db@100 mc	5db@100 mc	20 volts

The new Philco T-2857 is industry's first silicon amplifier transistor to be functionally tested at 100 mc for fixed-matched, fixed neutralized, and fixed-bias performance. This insures interchangeability in practical communications circuits.

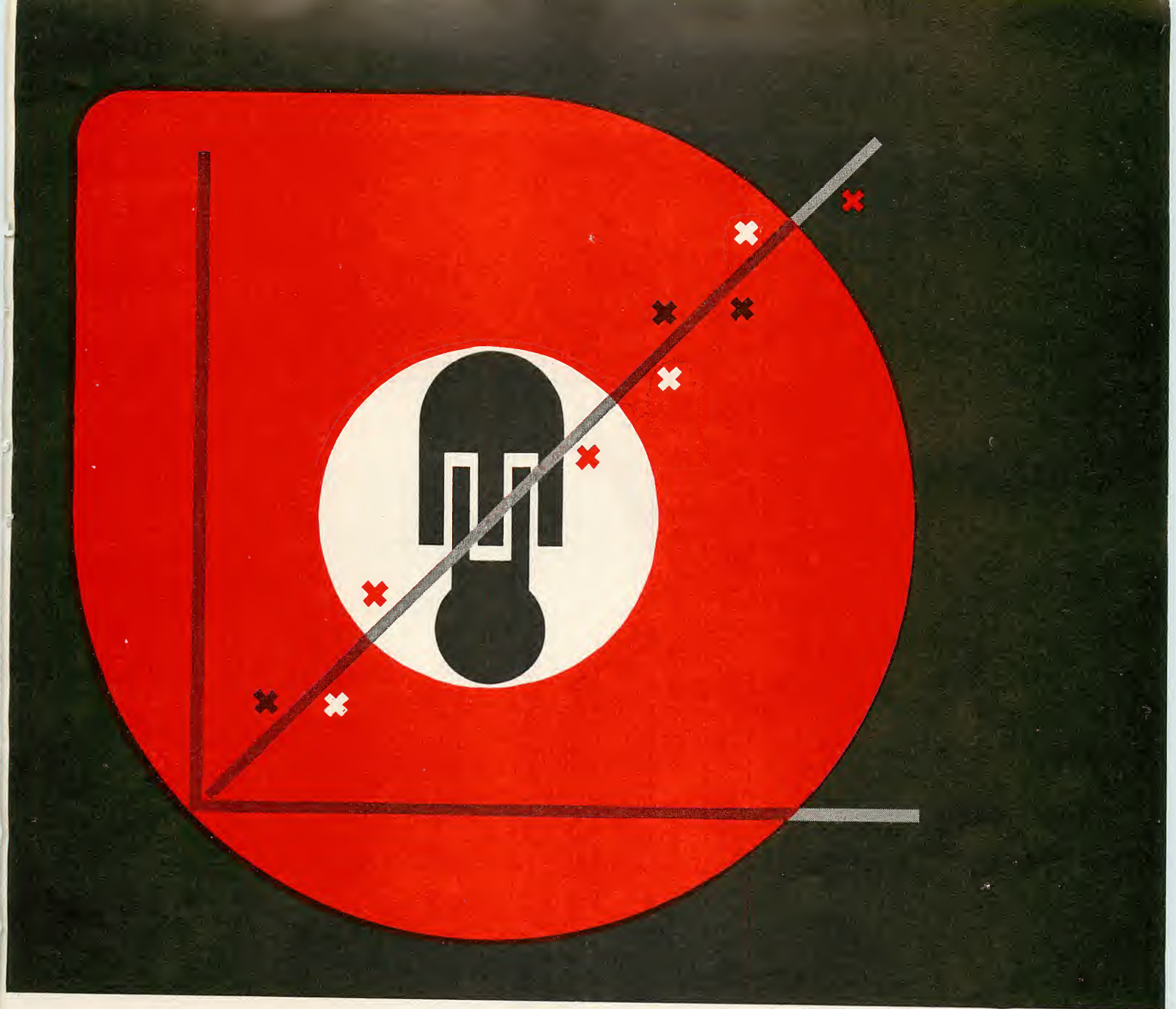
*TO-18 case with 4 leads—collector isolated from case.



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VERY HIGH SPEED SWITCHES

These Philco Types Feature Industry's Best Combination of Voltage, Switching Speed, and Beta.

TYPE†	Maximum Ratings					Characteristics							
	T _s °C.	V _{CB0} volts	V _{CE0} volts	P _T @ 25° C. mw	I _C ma	I _{CB0} max. μa	h _{FE} min.	V _{CE} (SAT) max. volts	f _T min. mc	C _{ob} max. pf	t _s max. nsec	t _{on} max. nsec	t _{off} max. nsec
2N2710	300	40	20	360	500	0.03	40	0.25	500	4	15	20	35
2N2651	300	40	20	360	500	0.03	25	0.25	350	4	25	35	75
2N914	300	40	15	360	500	0.025	30	0.25	300	6	20	40 @ 200 ma	40 @ 200 ma
2N834	175	40	30**	300	200	0.50	25	0.25	350	4	25	35	75
2N784A	300	40	15	350	200	0.025	25	0.19	300	3.5	15	20	40
2N708	300	40	15	360		0.025	30	0.40	300	6	25		
2N706	175	25	20*	300	50	0.5	20	0.60	200	6	60		

*V_{CEr}

**V_{CEs}

† TO-18 case—collector internally connected to case.

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LANSDALE DIVISION, LANSDALE, PA.



LL continued

Cross Index Key	Type No.	Mfr.	Type	f _{ae} *f _T **f _{ab} (mc)	MAX. RATINGS				CHARACTERISTICS				SWITCHING			Remarks
					P _c (mw)	T _i (°C)	m _w /°C	V _{CEO} V _{CBO} (v)	I _C (ma)	h _{fe} *h _{FE}	I _{CO} (μA)	C _{oe} *C _{ob} (pf)	t _r (μsec) *t _{on} (nsec)	t _s (μsec) *t _{off} (nsec)	V _{ce(sat)} (v)	
LL 15	2N2184	PH	pnnp,SAT,si	*6	150	140	1.3	*15	50	*15	0.0003	*12	—	—	—	Pair 2N2183 Chopper 2N2274 chopper 2N2276
	2N2274	PH	pnnp,SP,si	*6	150	140	1.3	25	50	10	0.045	9	—	—	—	
	2N2275	PH	pnnp,SP,si	*6	150	140	1.3	25	50	10	0.045	9	—	—	—	
	2N2276	PH	pnnp,SP,si	*6	150	140	1.3	15	50	10	0.003	9	—	—	—	
	2N2277	PH	pnnp,SP,si	*6	150	140	1.3	15	50	10	0.003	9	—	—	—	
	2N2185	PH	pnnp,SP,si	*6.5	150	140	1.3	30	50	—	0.001	9	—	—	—	chopper M. Pair 2N2185
	2N2186	PH	pnnp,SP,si	*6.5	150	140	1.3	30	50	—	0.001	9	—	—	—	
	2N2187	PH	pnnp,SP,si	*6.5	150	140	1.3	30	50	—	0.001	9	—	—	—	
2N100	SY	npn,AJ,ge	7	150	100	2	40	—	25(min)	15	—	—	—	—	GI	
2N1090	RCA	npn,AJ,ge	7	120	85	—	25	400	50	4	—	0.25	0.20	—		
LL 16	2N1114	SY	npn,AJ,ge	7	150	100	2	*15	200	—	30	—	—	—	—	TI Chopper 2N2278
	2N1995	TI	npn,AJ,ge	7	150	85	2.5	25	300	—	5	11	—	—	—	
	GT123	GI	pnnp,AJ,ge	7	150	150	2	*25	—	40	3	15	0.9	0.5	0.1	
	2N2278	PH	pnnp,SAT,si	*7.6	150	140	1.3	15	50	—	0.001	9	—	—	—	
	2N2279	PH	pnnp,SAT,si	*7.6	150	140	1.3	15	50	—	0.001	9	—	—	—	
	2N123	GE	pnnp,AJ,ge	8	150	85	2.5	15	125	0.987	6	15	0.45	0.90	0.15	SY SY, GE, RA, TI TI, GI, SY, KF
	2N388	GI	npn,AJ,ge	8	150	100	2	*25	500	—	5	10	0.6	0.4	—	
	2N396	GE	pnnp,AJ,ge	8	200	100	3.3	20	200	—	6	12	0.4	0.6	0.08	
2N396A	PH	pnnp,AJ,ge	*8	500	100	6.67	*30	200	*100	6	*14	.25	.15	.15		
2N576A	SY	npn,AJ,ge	8	200	100	2.6	40	400	—	40	—	2	1	0.4		
LL 17	2N579	RCA	pnnp,AJ,ge	8	120	71	—	20	400	30	3	—	0.36	0.33	0.2	IND, US, KF, GI US,IND,GI,KF,TI
	2N581	RCA	pnnp,AJ,ge	8	150	85	—	18	100	30	3	12	0.20	0.20	0.35	
	2N583	RCA	pnnp,AJ,ge	8	120	85	—	18	100	30	3	12	0.20	0.20	0.35	
	2N597	PH	pnnp,AJ,ge	*8	250	100	3.3	*45	500	*70	3.5	*15	—	—	0.085	
	2N598	PH	pnnp,AJ,ge	8	250	100	3.3	*35	500	125*	3	*15	—	—	0.085	
	2N600	PH	pnnp,AJ,ge	*8	750	100	10	*35	500	*125	3	*15	—	—	0.085	MIL KF Submin Submin
	2N662	RA	pnnp,FA,ge	8	150	85	—	11	1a	—	2.5	12	—	—	0.25	
	2N714	RCA	pnnp,AJ,ge	8	150	85	—	30	200	80	2	11	—	—	—	
2N790	RA	npn,DB,si	8	—	—	1.4	45	25	30	.002	8	—	—	—		
2N792	RA	npn,DB,si	8	—	—	1.4	45	25	60	.002	5	—	—	—	—	
LL 18	2N903	RA	npn,DB,si	8	—	—	—	45	25	30	.002	20	—	—	—	Submin Submin
	2N905	RA	npn,DB,si	8	—	—	—	45	25	80	.002	20	—	—	—	
	2N1280	IND	pnnp,AJ,ge	8	200	85	3.33	16	400	60	5	10	.10	—	—	TO-5,GI,SY,GE,AMP TO-5, KF, GI, AMP KF KF US
	2N1284	IND	pnnp,AJ,ge	8	150	85	2.5	20	400	90	2	15	.45	.9	15	
	2N1304	TI	npn,AJ,ge	8	150	85	2.5	*25	300	110	5	16	.45	.50	.1v	
	2N1305	TI	pnnp,AJ,ge	8	150	85	2.5	*30	300	100	3	11	.28	.80	.1v	
	2N1347	IND	pnnp,AJ,ge	8	150	85	2.5	20	200	80	2.5	12	—	—	—	
	2N1350	IND	pnnp,AJ,ge	8	200	85	3.33	50	400	95	10	12	—	—	—	KF KF US
2N1351	IND	pnnp,AJ,ge	8	200	85	3.33	40	400	65	5	12	—	—	—		
2N1355	IND	pnnp,AJ,ge	8	200	85	3.33	30	200	80	2.5	12	.4	.6	0.08		
LL 19	2N1356	IND	pnnp,AJ,ge	8	200	100	2.66	30	200	80	2.5	12	.4	.6	0.08	US
	2N1478	PH	pnnp,AJ,ge	*8	250	100	3.3	*30	500	*70	3.5	*15	—	—	.085	
	2N1685	SY	npn,AJ,ge	8	100	100	1.3	25	200	40	10	20	—	—	—	
	2N2001	TI	pnnp,AJ,ge	8	300	100	4	30	750	—	5	30	—	—	—	
	2N2177	SSD	pnnp,AJ,si	*8	100	175	0.7	6	50	*95	*0.5	10	—	—	—	
	2N2178	SSD	pnnp,AJ,si	*8	100	175	0.7	6	50	*95	*0.5	10	—	—	—	USAF2N167-MIL SY, TI GI KF
	2N167	GE	npn,GJ,ge	9	65	85	1.1	30	75	0.985	1.5	2.5	0.4	0.7	0.35	
	2N358	GI	npn,AJ,ge	9	100	85	2	20	500	60	3	14	0.4	0.5	0.18	
2N358A	SY	npn,AJ,ge	9	150	100	2	*30	500	25-75	5	14	—	—	—		
2N394	GE	pnnp,AJ,ge	9	150	85	2.5	10	200	—	6	12	—	—	0.04		
LL 20	2N823	RA	npn,AJ,ge	9	75	85	1.25	25	100	40	5	20	—	—	—	Submin
	2N1198	GE	npn,RG,ge	9	65	85	1.1	25	75	—	1.5	2.5	0.4	0.7	0.35	
	2N2274	PH	pnnp,SP,si	*9	150	140	1.3	*25	50	*15	.003	*6	—	—	—	Chopper pair 2N2274 chopper
	2N2275	PH	pnnp,SP,si	*9	150	140	1.3	*25	50	*15	.003	*6	—	—	—	
	2N2276	PH	pnnp,SP,si	*9	150	140	1.3	*15	50	*15	.003	*6	—	—	—	
	2N2277	PH	pnnp,SP,si	*9	150	140	1.3	*15	50	10	0.003	*9	—	—	—	pair 2N2276
	2N397	RCA	pnnp,AJ,ge	10	150	85	—	30	200	*40	6	*20	—	—	0.2	
	2N440	SY	npn,AJ,ge	10	100	85	1.66	*15	—	—	10	—	0.3	0.7	0.25	
2N518	GE	pnnp,AJ,ge	10	150	85	2.5	12	125	—	6	12	0.8	0.9	0.15		
2N521	IND	pnnp,AJ,ge	10	150	85	2.5	15	200	70	1	14	—	—	—	US, KF	
LL 21	2N521A	IND	pnnp,AJ,ge	10	150	85	2.5	25	200	150	1	14	0.2	0.5	—	US, KF
	2N600	PH	pnnp,AJ,ge	10	750	100	10	35	500	—	10	15	—	—	0.085	
	2N659	RA	pnnp,FA,ge	10	150	85	—	14	1a	—	2.5	12	—	—	0.25	
	2N745	RA	npn,MS,si	10	150	175	0.75	45	50	22	10	3	—	—	—	
	2N805	RA	pnnp,AJ,ge	10	75	85	1.25	30	400	60	4	20	—	—	—	
	2N806	RA	pnnp,AJ,ge	10	75	85	1.25	30	400	60	4	20	—	—	—	Submin Submin Submin
	2N821	RA	npn,AJ,ge	10	75	85	1.25	30	400	40	10	20	—	—	—	
	2N822	RA	npn,AJ,ge	10	75	85	1.25	30	400	40	10	20	—	—	—	
2N1281	IND	pnnp,AJ,ge	10	200	85	3.33	16	400	90	5	10	.9	—	—		
2N1349	IND	pnnp,AJ,ge	10	200	85	3.33	40	400	110	5	12	—	—	—	—	



Obsoletes the Silicon Alloy Transistor

with a complete line of

Bed Mounted, Passivated Epitaxial Junction PNP Silicon Transistors

Featuring

HIGH V_{eb}	LOW OFFSET VOLTAGE
ULTRA LOW LEAKAGE	HIGH FREQUENCY
<u>RELIABILITY</u>	

These transistors are available in TO-5, TO-18, TO-46 and Molytab packages.

Typical Specifications for Low Level Chopper Circuits			
Characteristic	Type Designation		
	C9001	C9002	C9003
V_{cb} and V_{eb} ($I_b = 10^{-10}a$)	15v	25v	40v
V_{ce}	10v	20v	35v
I_{cbo} and I_{ebo} (100°C)	3nA	3nA	3nA
V_o ($I_b = 200 \mu a$; $I_e = 0$)	0.3mV	0.5mV	0.8mV
Beta at 1mc ($I_c = 1ma$; $V_{ce} = 6v$)	30	20	10
Dissipation (case temp. = 25°C)	2 watts	2 watts	2 watts
Max. Operating Temperature	200°C	200°C	200°C
Package	TO-46	TO-46	TO-46

In addition, virtually all present PNP types can be supplied in this new construction in quantities and at competitive prices for direct replacement in existing circuits.

Write or call to discuss your requirements.

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LL continued

Cross Index Key	Type No.	Mfr.	Type	f_{ae} f_{ab} (mc)	MAX. RATINGS				CHARACTERISTICS				SWITCHING			Remarks
					P_c (mw)	T_j (°C)	$m_w/°C$	V_{CEO} V_{CBO} (v)	I_C (ma)	h_{fe} h_{FE}	I_{CO} (μ a)	C_{oe} C_{ob} (pf)	t_r (μ sec) t_{on} (nsec)	t_s (μ sec) t_{off} (nsec)	$V_{ce(sat)}$ (v)	
LL 22	2N1996	TI	npn,AJ,ge	10	150	85	2.5	20	300	—	5	11	—	—	—	Chopper Chopper Pair 2N2185
	2N1998	TI	npn,AJ,ge	10	250	100	3.3	35	400	—	4	15	—	—	—	
	2N2185	PH	npn,SP,si	10	150	140	1.3	*30	50	—	0.001	*6	—	—	—	
	2N2186	PH	npn,SP,si	10	150	140	1.3	*30	50	—	0.001	*9	—	—	—	
	2N2187	PH	npn,SP,si	10	150	140	1.3	*30	50	—	0.001	*6	—	—	—	
	2N2648	GI	npn,AJ,ge	**10	250	100	3.3	*35	1a	*80-500	3	*18	.12	.6	.2	KF, TS, TI, IND, RA, US Submin Submin
	R212	TS	npn,AJ,ge	**10	0—	85	—	30	400	*20	—	*200	5	*20	0.105	
	2N427	GI	npn,AJ,ge	11	150	100	2	*30	—	—	2	14	0.43	0.3	—	
	2N791	RA	npn,DB,si	11	—	—	1.4	45	25	60	.002	5	—	—	—	
	2N904	RA	npn,DB,si	11	—	—	—	45	25	60	.002	20	—	—	—	
LL 23	2N316	GI	npn,AJ,ge	12	100	85	2	*20	500	—	1	14	0.4	0.4	0.14	KF IND, US, KF TI, KF US,GE,RA,GI,SY,KF, PH, TI, AMP
	2N316A	GI	npn,AJ,ge	12	150	100	2	*30	500	130	1	14	0.4	0.4	0.14	
	2N397	GE	npn,AJ,ge	12	200	100	3.3	15	200	—	6	12	0.3	0.7	0.07	
	2N404	RCA	npn,AJ,ge	12	120	85	—	*25	100	—	5	—	0.17	0.20	0.12	
	2N428A	GI	npn,AJ,ge	12	150	100	2	*0.25	10	100	5	20	0.43	0.3	0.22	
	2N635	GE	npn,AJ,ge	12	150	85	2.5	20	300	—	5	—	—	—	—	TO-5,GI,SY,GE,AMP TO-5, GI, KF,AMP KF, TI KF
	2N1306	TI	npn,AJ,ge	12	150	85	2.5	*25	300	110	5	16	.22	.50	.1v	
	2N1307	TI	npn,AJ,ge	12	150	85	2.5	*30	300	110	3	11	.20	.80	.1v	
	2N1313	IND	npn,AJ,ge	12	175	85	—	*30	400	80	—	14	—	—	—	
	2N1344	IND	npn,AJ,ge	12	150	85	2.5	15	400	90	5	12	0.7	0.3	—	
LL 24	2N1345	IND	npn,AJ,ge	12	150	85	2.5	10	400	60	3	14	.3	.4	—	KF KF Chopper Pair 2N2278
	2N1346	IND	npn,AJ,ge	12	150	85	2.5	12	400	125	2.5	14	.3	.4	.10	
	2N1357	IND	npn,AJ,ge	12	200	85	3.33	30	200	85	2.5	12	.3	.7	0.07	
	2N2278	PH	npn,SAT,si	*12	150	140	1.3	*15	50	—	0.001	*6	—	—	—	
	2N2279	PH	npn,SAT,si	*12	150	140	1.3	*15	50	—	0.001	*6	—	—	—	
	2N269	RCA	npn,AJ,ge	13	120	85	—	25	100	40	2	—	0.17	0.20	0.12	Submin Submin GI KF, RCA, TI
	2N793	RA	npn,DB,si	13	—	—	1.4	45	25	150	.002	5	—	—	—	
	2N906	RA	npn,DB,si	13	—	—	—	45	25	150	.002	20	—	—	—	
	2N1091	RCA	npn,AJ,ge	13	120	85	—	25	400	70	4	—	0.20	0.17	—	
	2N582	SY	npn,AJ,ge	14	120	71	2.6	*25	100	40(min)	5	—	—	—	—	
LL 25	2N584	RCA	npn,AJ,ge	**14	120	85	—	25	100	60	2	12	0.15	0.17	0.2	US Submin Submin SPR SPR
	2N807	RA	npn,AJ,ge	14	75	85	1.25	25	100	40	5	20	—	—	—	
	2N808	RA	npn,AJ,ge	14	75	85	1.25	25	100	40	5	20	—	—	—	
	2N858	PH	npn,SP,si	14	150	140	1.3	*40	50	33	.1	5	—	—	—	
	2N859	PH	npn,SP,si	14	150	140	1.3	*40	50	65	.1	5	—	—	—	
	2N860	PH	npn,SA,si	14	150	140	1.3	*25	50	33	.1	5	—	—	—	SPR SPR GI,IND,US,TS,KF TI KF, TI
	2N862	PH	npn,SP,si	14	150	140	1.3	*15	50	33	.1	5	—	—	—	
	2N580	RCA	npn,AJ,ge	15	120	71	—	20	400	45	3	—	0.16	0.29	0.2	
	2N636A	SY	npn,AJ,ge	15	150	100	2	*25	300	100-300	6	20	—	—	—	
	2N660	RA	npn,FA,ge	15	150	85	—	11	1a	—	2.5	12	—	—	0.25	
LL 26	2N1282	IND	npn,AJ,ge	15	200	85	3.33	15	400	100	5	10	.8	—	—	KF KF Chopper 2N2280
	2N1316	IND	npn,AJ,ge	15	200	85	3.33	30	400	100	2	14	—	—	—	
	2N1317	IND	npn,AJ,ge	15	200	85	3.33	20	400	95	3	14	—	—	—	
	2N1318	IND	npn,AJ,ge	15	200	85	3.33	10	400	85	4	14	—	—	—	
	2N1999	TI	npn,AJ,ge	15	250	100	3.33	30	400	—	4	15	—	—	—	
	2N388A	TI	npn,AJ,ge	**16	150	—	—	40	200	*60-180	5	*20	—	—	—	MIL Chopper
	2N599	PH	npn,AJ,ge	*16	250	100	3.3	*30	500	*175	3.5	*15	—	—	0.07	
	2N601	PH	npn,AJ,ge	16	750	100	10.0	*30	500	*175	3.5	*15	—	—	*0.07	
	2N2280	PH	npn,SAT,si	*16	150	140	1.3	10	50	—	0.003	10	—	—	—	
	2N2281	PH	npn,SAT,si	*16	150	140	1.3	10	50	—	0.003	10	10	—	—	
LL 27	2N428	GI	npn,AJ,ge	17	150	100	2	*30	—	—	2	14	0.43	0.3	0.22	SY, RA, IND, US, PH, TS, TI, KF, GE TI US,KF US,KF,TI TS,GI,IND,SY,KF
	2N636	GE	npn,AJ,ge	17	150	85	2.5	*20	—	—	5	—	—	—	—	
	2N522	IND	npn,AJ,ge	18	150	85	2.5	15	200	120	1	14	—	—	—	
	2N522A	IND	npn,AJ,ge	18	150	85	2.5	*25	200	200	1	14	0.2	0.5	—	
	2N582	RCA	npn,AJ,ge	18	120	85	—	25	100	60	5	—	0.15	0.17	0.2	
	2N584	RCA	npn,AJ,ge	18	120	85	—	25	100	60	2	12	0.15	0.17	0.2	US TO-5,SY,GE,AMP TO-5, KF, GI, AMP
	2N1308	TI	npn,AJ,ge	18	150	85	2.5	*25	300	200	5	15	—	—	—	
	2N1309	TI	npn,AJ,ge	18	150	85	2.5	*30	300	210	3	11	—	—	—	
	2N2165	SPR	npn,SP,si	*18	150	—	1.3	*30	—	2.5-4.5	0.02	*10	—	—	—	
	2N2166	SPR	npn,SP,si	*18	150	—	1.3	*15	—	2.5-4.5	0.02	*10	—	—	—	
LL 28	2N2377	SPR	npn,SP,si	18	150	140	1.3	*25	50	20	.002	—	—	—	—	TO-18 US, IND, KF IND, US, KF, PH TR, RA, GE, AMP KF, US, TI
	2N317	GI	npn,AJ,ge	20	100	85	2	*30	500	—	1	14	0.3	0.4	0.18	
	2N317A	GI	npn,AJ,ge	20	150	100	2	*30	500	180	1	14	0.3	0.4	0.18	
	2N337	TI	npn,GD,si	20	125	150	.001	*45	20	19	1	—	0.05	0.02	1.5	
	2N417	IND	npn,AJ,ge	20	200	85	3	*30	200	140	2	—	—	—	—	
	2N496	PH	npn,SAT,si	20	150	140	1.3	*10	50	*25	.001	*6	—	—	.06	MIL KF, TI Submin
	2N661	RA	npn,FA,ge	20	150	85	—	9	1a	—	2.5	12	—	—	0.25	
	2N746	RA	npn,MS,si	20	150	175	0.75	45	50	45	10	3	—	—	—	
	2N1008	BE	npn,AJ,ge	20	400	85	6.6	20	300	100	10	—	—	—	0.25	
	2N1008A	BE	npn,AJ,ge	20	400	85	6.6	40	300	100	10	—	—	—	0.25	

In POWER WIRE WOUND RESISTORS

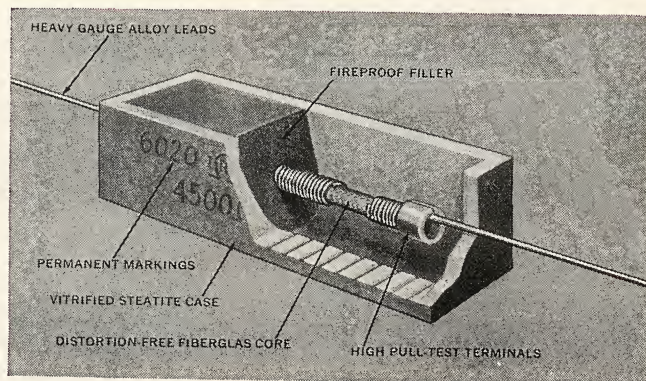
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IRC PW Resistors are available with special resistance windings, designed to act as a standard resistor at normal operating wattages and fuse at some specific overload condition. They can also provide positive temperature compensation to offset transistor high temperature avalanching. Thus they offer a standard circuit resistor that can provide fusing or temperature compensating characteristics in one unit at a cost as low as 5 cents each.

These triple-duty resistors come in seven sizes—2, 3, 5, 7, 10, 15 and 20 watts. Write for Bulletin P-7: International Resistance Co., 401 N. Broad Street, Philadelphia 8, Pa.



LL continued

Cross Index Key	Type No.	Mfr.	Type	f _{ce} *f _T **f _{cb} (mc)	MAX. RATINGS				CHARACTERISTICS				SWITCHING			Remarks
					P _c (mw)	T _j (°C)	m _w /°C	V _{CEO} *V _{CBO} (v)	I _C (ma)	h _{FE} *h _{FE}	I _{CO} (μa)	C _{ob} *C _{ob} (pf)	t _r (μsec) *t _{on} (nsec)	t _s (μsec) *t _{off} (nsec)	V _{ce(sat)} (v)	
LL 29	2N1008B	BE	pn _p ,A _J ,ge	20	400	85	6.6	60	300	100	10	—	—	—	0.25	KF SPR-MIL
	2N1017	US	pn _p ,F _A ,ge	20	150	85	—	10	400	—	2	12	0.25	—	0.25	
	2N1119	PH	pn _p ,S _{AT} ,si	*20	150	140	1.3	*10	50	*25	.001	6.0	—	—	0.06	
	2N2162	SPR	pn _p ,S _P ,si	*20	150	—	1.3	*30	—	3.5-35	0.01	*10	—	—	—	
	2N2163	SPR	pn _p ,S _P ,si	*20	150	—	1.3	*15	—	3.5-35	0.01	*10	—	—	—	
LL 30	CK419	-RA	np _n ,F _A ,si	20	385	160	—	40	50	15	.005	35	—	—	—	Low noise, low level unit SPR US, KF US, KF Chopper Pair 2N2280
	CK420	RA	np _n ,F _A ,si	20	385	160	—	35	50	30	.005	—	—	—	—	
	CK421	RA	np _n ,F _A ,si	20	385	160	—	30	50	60	.005	20	—	—	—	
	CK474	RA	np _n ,D _B ,si	20	250	180	1.9	40	50	15	.005	20	—	—	—	
	CK475	RA	np _n ,D _B ,si	20	250	180	1.9	35	50	30	.005	20	—	—	—	
LL 31	CK476	RA	np _n ,D _B ,si	20	250	180	1.9	30	50	60	.005	20	—	—	—	Submin TR, RA, NA, GE AMP *gain-bandwidth, GI *gain bandwidth, GI Submin
	CK477	RA	np _n ,D _B ,si	20	250	180	1.9	30	50	65	.005	20	—	—	—	
	TMT1543	TR	np _n ,MS	20	30	150	—	6	—	15	0.01	—	—	—	—	
	2N861	PH	pn _p ,S _P ,si	22	150	140	1.3	*25	50	65	0.1	5	—	—	—	
	2N863	PH	pn _p ,S _P ,si	22	150	140	1.3	*15	50	65	.1	5	—	—	—	
	2N864	PH	pn _p ,S _P ,si	22	150	140	1.3	*6	50	65	.1	—	—	—	—	
	2N523	IND	np _n ,A _J ,ge	24	150	85	2.5	15	200	200	1	14	—	—	—	
	2N523A	IND	np _n ,A _J ,ge	24	150	85	2.5	20	200	300	1	14	—	—	—	
	2N2280	PH	pn _p ,S _P ,si	*24	150	140	1.3	*10	50	—	3	*7	—	—	.05	
	2N2281	PH	pn _p ,S _P ,si	*24	150	140	1.3	*10	50	—	3	*7	—	—	.05	
LL 32	2N747	RA	np _n ,MS,si	25	150	175	0.75	25	50	30	10	6	—	—	—	NA
	2N748	RA	np _n ,MS,si	25	150	175	0.75	45	50	10	1	—	—	—	—	
	2N338	TI	np _n ,MS,si	30	125	150	.001	30	20	39	1	—	—	—	—	
	2N643	RCA	pn _p ,D _R ,ge	*30	120	71	—	—	100	45	3	2	—	—	—	
	2N645	RCA	pn _p ,D _R ,ge	*30	120	85	—	—	100	45	3	2	—	—	—	
	2N907	RA	np _n ,D _B ,si	30	—	—	—	45	25	35	.002	20	—	—	—	
	2N1060	WE	np _n ,D _B ,si	30	250	150	2.0	40	50	20	0.1	5	—	—	*200	
	2N1276	TI	np _n ,MS,si	*30	150	—	—	40	25	9-22	—	—	—	—	—	
	KGS1004	KF	pn _p ,A _J ,ge	32	200	85	3	10	400	120	12	*10	—	—	—	
	2N2167	SPR	pn _p ,S _P ,se	*36	150	—	1.3	*12	—	4-9	0.02	—	—	—	—	
LL 33	2N842	TR	np _n ,G _J ,si	44	300	175	—	*45	25	20	0.1	6	—	—	—	Submin *gain bandwidth, GI
	2N2164	SPR	pn _p ,S _P ,si	*44	150	—	1.3	*12	—	20	0.02	*10	—	—	—	
	TMT842	TR	np _n ,D _J ,si	44	150	175	—	*45	25	20	.1	6	—	—	2 max	
	TMT840	TR	np _n ,MS	45	150	175	—	*45	—	20	1 max	15 max	—	—	2 max	
	TMT839	TR	np _n ,MS	45	150	175	—	*45	—	20	1 max	15 max	—	—	—	
	2N908	RA	np _n ,D _B ,si	45	—	—	—	45	25	75	.002	20	—	—	—	
	2N337A	GE	np _n ,G _D ,si	*50	500	175	3.33	*45	20	*55	0.001	*2	—	—	—	
	2N644	RCA	pn _p ,D _R ,ge	*50	120	71	—	30	100	45	3	—	—	—	1.5	
	2N2349	GE	np _n ,G _D ,si	*50	150	200	—	*40	25	*250	1.0	*4	—	—	—	
	2N2677	GE	np _n ,G _D ,si	*50	250	—	1.66	*45	25	120	.1	*3	—	—	0.8	
LL 34	2N3030	TR	np _n ,D _J ,si	50	100	150	0.8	15	—	—	50	4	—	—	40	SPR TO-5 package TO-5 package TO-5 package
	TMT1131	TR	pn _p ,MS	50	150	200	—	*15-45	1 max	*15-45	1 max	45 max	—	—	1.5 max	
	TN7842	TR	np _n ,MES _A ,si	*50	100	175	0.66	45	50	*20	0.1	*6	—	—	0.05	
	TN7843	TR	np _n ,MES _A ,si	*50	100	175	0.66	45	50	*45	0.1	*6	—	—	0.05	
	2N865	PH	pn _p ,S _P ,si	52	150	140	1.3	*10	50	150	.1	5	—	—	—	
	2N1254	HU	pn _p ,MS,si	55	250	160	1.8	30	—	25	0.2	8	—	—	.015	
	2N1256	HU	pn _p ,MS,si	55	250	160	1.8	40	—	25	0.2	8	—	—	—	
	2N1258	HU	pn _p ,MS,si	55	250	160	1.8	30	—	25	0.2	8	—	—	—	
	2N1477	PH	pn _p ,MA,ge	60	25	85	—	*6	50	120	.5	*3.5	—	—	.1	
	2N1779	SY	np _n ,A _J ,ge	60	100	100	1.3	25	100	25	10	10	—	—	—	
LL 35	2N2244	NA	np _n ,si	60	500	200	2.85	200	100	40-120	0.01	8	—	—	—	4db NF 4db NF 4db NF 4db NF 4db NF For 100 ua Switching For 100 ua Switching US, NA Gain band width, GI
	2N2245	NA	np _n ,si	60	500	200	2.85	200	100	40-120	0.01	8	—	—	—	
	2N2246	NA	np _n ,si	60	500	200	2.85	20	100	80-250	0.01	8	—	—	—	
	2N2247	NA	np _n ,si	60	500	200	2.85	20	100	150-450	0.01	8	—	—	—	
	2N2248	NA	np _n ,si	60	500	200	2.85	45	100	40-120	0.01	8	—	—	—	
	2N2249	NA	np _n ,si	60	500	200	2.85	45	100	80-250	0.01	8	—	—	—	
	2N2250	NA	np _n ,si	60	500	200	2.85	45	100	150-450	0.01	8	—	—	—	
	2N2251	NA	np _n ,si	60	500	200	2.85	20	100	80-250	0.01	8	—	—	—	
	2N2252	NA	np _n ,si	60	500	200	2.85	20	100	130-450	0.01	8	—	—	—	
	2N2253	NA	np _n ,si	60	500	200	2.85	45	100	40-120	0.01	8	—	—	—	
LL 35	2N2254	NA	np _n ,si	60	500	200	2.85	45	100	80-250	0.01	8	—	—	—	4db NF 4db NF 4db NF 4db NF 4db NF For 100 ua Switching For 100 ua Switching US, NA Gain band width, GI
	2N2255	NA	np _n ,si	60	500	200	2.85	45	100	150-450	0.01	8	—	—	—	
	2N2893	TI	np _n ,PE,si	*60	600	175	4.0	30	30	*60	.001	*3.4	—	—	0.1	
	2N2894	TR	np _n ,PE,si	*60	600	175	4.0	20	30	*30	.001	*3.4	—	—	0.1	
	TMT1132	TR	pn _p ,MS	60	150	200	—	*50	—	*30-90	1 max	45 max	—	—	1.5 max	
	2N843	TR	np _n ,D _J ,si	64	300	175	—	*45	25	40	.1	6	—	—	—	
	TMT843	TR	np _n ,D _J ,si	64	150	175	—	*45	25	40	.1	6	—	—	—	
	TMT841	WE	np _n ,MS	65	150	175	—	*45	—	80-330	0.1	1 max	—	—	2 max	
	2N560	RCA	pn _p ,D _D ,si	70	500	150	4.0	60	100	20	0.1	8	—	—	.5	
	2N645	RCA	pn _p ,D _R ,ge	70	120	85	—	30	100	45	3	2	—	—	—	

HITACHI TRANSISTORS

SPECIFY "MESA" TYPE TRANSISTORS FOR HIGH FREQUENCY USE

2SA233, 2SA234, 2SA235

Hitachi PNP germanium diffused "Mesa" type transistors provide outstanding high frequency characteristics compared with conventional alloy junction or drift transistors.

Exclusive "Mesa" type transistors are indispensable for FM receivers used in tuner circuits and intermediate frequency amplifiers and also in TV receivers in intermediate

frequency amplifiers. They can be used effectively in short-wave converters, medium wave converters and all high frequency applications.

For superior performance, specify Hitachi "Mesa" type transistors . . . another engineering achievement from one of the world leaders in electronics.

Maximum Ratings ($T_a=25^{\circ}\text{C}$)

Items	Symbol	Unit	2SA233	2SA234	2SA235
Collector Voltage	V _{CB0}	V	— 20	— 20	— 20
Emitter Voltage	V _{EB0}	V	— 0.5	— 0.5	— 0.5
Collector Current	I _C	mA	— 10	— 10	— 10
Emitter Current	I _E	mA	10	10	10
Junction Temperature	T _j	°C	85	85	85
Collector Dissipation	P _C	mW	80	80	80
Ambient Temperature	T _A	°C	60	60	60

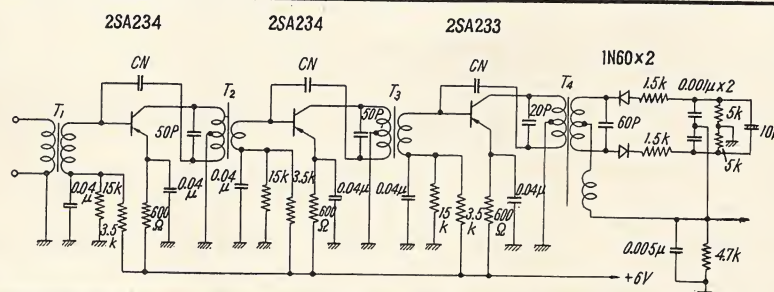
Characteristics ($T_a = 25^\circ\text{C}$)

Items	Symbol	Conditions for measurement	Unit	2SA233	2SA234	2SA235
Max. Collector Cut-off-Current	ICBO	$V_C = -20V$ $I_E = 0$	μA	-30	-30	-30
Max. Emitter Cut-off-Current	IEBO	$V_E = -0.5V$ $I_C = 0$	μA	-50	-50	-50
Current Amplification Factor	hfe	$V_C = -6V$ $I_E = 1mA$		50	60	80
Alpha Cut-off Frequency	f α_b	$V_C = -6V$ $I_E = 1mA$	Mc	90	110	125

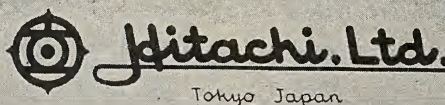
Typical Operation ($T_a = 25^\circ\text{C}$)

Items	Conditions for Measurement	Unit	2SA233	2SA234	2SA235
Power Gain at FM Radio Frequency	$V_C = -6V$ $I_E = 1mA$	db			
	$f_s = 100Mc/s$		—	—	12
	$R_g = 75\Omega$ $R_L = 2k\Omega$				
Mixer Gain at FM Radio Frequency	$V_C = -6V$ $I_E = 1mA$	db			
	$f_s = 100Mc/s$ $f_{osc} = 110.7Mc$		—	—	13
	$R_g = 3k\Omega$ $R_L = 15k\Omega$				

10.7 Mc Intermediate Frequency Amplifier Circuit



Hitachi New York, Ltd.
666, 5th Avenue, New York 19, N.Y., U.S.A.,
Sole Agent:
International Importer Inc.
2242 South Western Avenue, Chicago 8, Illinois, U.S.A.



LL continued

Cross Index Key	Type No.	Mfr.	Type	f_{ae} f_T f_{ab} (mc)	MAX. RATINGS				CHARACTERISTICS				SWITCHING			Remarks
					P_c (mw)	T_j (°C)	$m_w/°C$	V_{CEO} V_{CBO} (v)	I_C (ma)	h_{fe} h_{FE}	I_{CO} (μ a)	C_{oe} C_{ob} (pf)	t_r (μ sec) t_{on} (nsec)	t_s (μ sec) t_{off} (nsec)	$V_{ce(sat)}$ (v)	
LL 36	2N1411	PH	npn,MA,ge	*70	50	100	0.67	15	50	100	1.0	3.0	75	—	0.08	TO-5 Package
	2N2180	PH	npn,MA,ge	*70	50	100	0.67	15	50	100	1.0	3.0	75	—	0.08	
	2N1255	HU	npn,MS,si	75	250	160	1.8	15	—	30	0.2	8	—	—	—	
	OC46	AMP	npn,PADT,ge	73	83	75	—	*20	125	80	3	—	—	—	—	TO-5 Package
	2N1257	HU	npn,MS,si	75	250	160	1.8	30	—	40	0.2	8	—	—	—	
	OC139	AMP	npn,PADT,ge	73.5	100	75	—	*20	250	45	0.8	—	—	—	—	TO-5 Package
	OC140	AMP	npn,PADT,ge	74.5	100	75	—	*20	250	75	0.8	—	—	—	—	
2N1259	HU	npn,MS,si	75	250	160	1.8	50	—	50	0.2	8	—	—	%		
OC47	AMP	npn,PADT,ge	75.5	83	75	—	*20	125	<200	<3	—	—	—	—		
2N706	FA	npn,DP,si	*80	1w	175	6.7	20	—	45	0.005	5	0.02	—	—	IND, TI, RCA, PH, CL, MO	
LL 37	TMT696	TR	npn,MS	80	150	200	—	*60	—	*20-60	1max	35max	—	—	1.5max	FA, NA, GI
	2N702	TI	npn,DJ,si	100	150	175	.002	20	50	15-45	.5	—	—	—	.6	
	2N2800	MO	npn,PE,si	*100	800	200	4.57	*50	—	*30/90	0.01	*25	25	100	0.4	
	2N2801	MO	npn,PE,si	*100	800	200	4.57	*50	—	*75/225	0.1	*25	25	100	0.4	
	TMT697	TR	npn,MS	100	150	200	—	60	—	*40-120	1max	35max	—	—	1.5max	TI
	2N1507	RA	npn,DD,si	120	1w	175	13.2	60	500	200	.003	20	80	600	.07	
	2N2188	TI	npn,AD,ge	*125	125	—	—	40	30	90	3	—	—	—	—	
	2N2190	TI	npn,AD,ge	*125	125	—	—	60	30	90	3	—	—	—	—	
	2N703	TI	npn,MS,si	*150	600	—	—	25	50	*40-120	—	—	—	—	0.5	
	2N1139	TR	npn,GR,si	150	500	175	—	15	25	20	.25	8	12	10	0.7	
LL 38	2N2189	TI	npn,AD,ge	*150	125	—	—	40	30	135	3	—	—	—	—	SPR, GI
	2N2191	TI	npn,AD,ge	*150	125	—	—	60	30	135	3	—	—	—	—	
	2N2330	MO	npn,DDP,si	150	800	175	5.33	*30	—	50	0.1	7	—	—	—	
	2N2331	MO	npn,DDP,si	150	500	175	3.33	*30	—	50	0.1	7	—	—	—	
	2N501	PH	npn,MD,ge	175	60	100	0.8	*15	50	—	1.0	1.75	0.013	0.007	0.08	SPR, GI
	2N501A	PH	npn,MD,ge	175	175	60	0.8	*15	50	—	1.0	1.1	0.013	0.007	1.0	
	2N768	PH	npn,MD,ge	*175	35	100	0.46	12	100	40	1	1.6	—	—	0.09	
	2N2411	TI	npn,PE,si	200	1000	200	5.71	20	100	*20-60	.001	*4	.008	.050	0.1	
	2N2086	PH	npn,MS,si	*225	600	175	4.0	*120	500	*70	2.0	*7.4	0.06	0.085	0.43	
	2N2087	PH	npn,MS,si	*225	600	175	4.0	*120	500	*65	2.0	*7.4	0.055	0.065	0.39	
LL 39	2N240C	PH	npn,MD,ge	225*	150	100	2.0	*12	100	*60	3	*2.2	—	0.1	0.13	MO
	2N1495	PH	npn,MD,ge	*240	250	100	3.3	*40	500	*60	7	*4.0	0.03	—	0.18	
	2N1495	PH	npn,MD,ge	*240	250	100	3.3	40	500	60	4	4.0	30	—	0.18	
	2N1496	PH	npn,MD,ge	*240	500	100	6.67	40	500	60	4	4.0	30	—	0.18	
	2N2048	PH	npn,MD,ge	250*	150	100	2.0	*20	100	125	1.0	*1.5	0.035	—	.19	MO,SY,GE,RA,AMP
	2N2380	PH	npn,MS,si	*270	600	175	4.0	*80	500	70	4	*7.4	0.06	0.06	0.6	
	2N2380A	PH	npn,MS,si	*270	600	175	4.0	*80	500	70	4	*7.4	0.06	0.06	0.4	
	2N2478	PH	npn,MS,si	*275	2000	175	4	*120	500	*70	2	*7.4	.055	.065	.45	
	2N559	WE	npn,DG,ge	300	150	100	4.0	*15	50	25	3	—	0.002	0.003	.3	
	2N705	TI	npn,AJ,ge	300	300	100	4	*15	50	6	.3	5	0.03	0.075	0.2	
LL 40	2N708	PH	npn,PL,si	*300	1200	200	2.1	*40	—	*120	.025	*6	—	.025	.4	SY,MO,RCA,GE,RA,AMP
	2N710	TI	npn,MS,ge	300	100	300	4	*15	50	6	.3	5	.06	.075	.80	
	2N711	TI	npn,MS,ge	300	300	100	—	*12	50	6	0.3	5	.07	0.1	.90	
	2N711A	TI	npn,MS,ge	*300	150	—	—	7	100	*25-150	1.5	*6	—	—	0.5	
	2N711B	TI	npn,MS,ge	*300	150	—	—	7	100	*30-150	1.5	*6	—	—	0.45	MO
	2N784A	PH	npn,PL,si	*300	1000	175	6.85	*40	200	*150	.025	*3.5	—	.015	.19	
	2N960	TI	npn,EM,ge	*300	150	—	—	15	150	*20	3	*4	—	—	0.5	
	2N961	TI	npn,EM,ge	*300	150	—	—	12	150	*20	3	*4	—	—	0.5	
	2N962	TI	npn,EM,ge	*300	150	—	—	12	150	*20	3	*4	—	—	0.5	
	2N964	TI	npn,EM,ge	*300	150	—	—	15	150	*40	3	*4	—	—	0.5	
LL 41	2N965	TI	npn,EM,ge	*300	150	—	—	12	150	*40	3	*4	—	—	0.5	MO,SY,PSI,TI,HU,NA,GI,CL,DP
	2N966	TI	npn,EM,ge	*300	150	—	—	12	150	*40	3	*4	—	—	0.5	
	2N985	TI	npn,EM,ge	*300	150	—	—	15	200	*60	3	*6	—	—	0.6	
	2N1992	WE	npn,D,si	300	350	200	2.0	15	50	30	0.5	5	—	20ns	0.25	
	2N2401	PH	npn,MD,ge	*300	150	100	2.0	*15	100	*90	1.5	*2.2	—	0.09	0.12	Epitaxial Epitaxial
	2N2717	AMP	npn,AD,ge	300	275	75	0.50	*15	300	50	—	—	.020	.040	—	
	2N2381	MO	npn,EM,ge	*300	750	100	10	*30	500	*25	1	*3.5	8	20	0.25	
	2N2382	MO	npn,EM,ge	*300	750	100	10	*45	500	*25	1	*3.5	8	20	0.25	
	2N2256	MO	npn,ME,si	320	1000	175	6.67	*7	100	30	3	4	3	4	—	
	2N2257	MO	npn,ME,si	320	1000	175	6.67	*7	100	50	3	4	3	4	—	
LL 42	2N2258	MO	npn,ME,ge	320	300	100	4	*7	100	30	3	4	4	3	—	Epitaxial Epitaxial, GI
	2N2259	MO	npn,ME,ge	320	300	100	4	*7	100	50	3	4	4	3	—	
	2N2402	PH	npn,MD,ge	*325	150	100	2.0	*18	100	170	1.5	*2.2	—	0.075	0.11	
	2N707A	MO	npn,DM,si	350	1w	175	6.7	*70	—	30	.01	4	—	—	—	
	2N537	WE	npn,D,ge	400	250	100	3.3	*30	100	9	0.1	—	—	—	—	MO,SY,TI,NA,HU,GI,TI,PH,CL,DP MO,SY,PSI,TI,HU,NA,GI,CL,DP Epitaxial, SY, RA
	2N706A	MO	npn,DM,si	400	1w	175	6.7	*25	—	4	.005	4.5	.018	.016	—	
	2N706B	MO	npn,DM,si	400	1w	175	6.7	*25	—	4	.005	4.5	.018	.016	—	
	2N828	MO	npn,DM,si	400	500	175	4	*15	200	4	.4	3.5	—	—	—	
	2N828A	MO	npn,DJEM,ge	*400	300	100	4	*15	200	*40	3	*2.2	—	30	0.11	
	2N829	MO	npn,DJEM,ge	*400	300	100	4	*15	200	*80	3	*2.2	—	30	0.11	

LL continued

Cross Index Key	Type No.	Mfr.	Type	f _{ae} *f _T **f _{ab} (mc)	MAX. RATINGS			CHARACTERISTICS				SWITCHING			Remarks	
					P _c (mw)	T _i (°C)	m _w /°C	V _{CEO} *V _{CBO} (v)	I _C (ma)	h _{FE} *h _{FE}	I _{CO} (μa)	C _{ob} *C _{ob} (pf)	t _r (μsec) *t _{on} (nsec)	t _s (μsec) *t _{off} (nsec)		V _{ce(sat)} (v)
LL 43	2N1195	WE	pn-p, D, ge	400	300	100	4.0	*30	50	25	5	2.5	—	—	—	SPR
	2N1204	PH	pn-p, MD, ge	*400	200	100	2.67	*20	500	30	4	*5.0	0.015	—	0.3	
	2N1204A	PH	pn-p, MD, ge	*400	200	100	2.67	*20	500	45	4	*5.0	0.015	—	0.3	
	2N1494A	PH	pn-p, MD, ge	*400	400	100	5.3	*20	500	*45	4	*5.0	0.015	—	0.3	
	2N2096	SPR	pn-p, ED, ge	*400	750	100	—	25	500	*40	12	*20	35	70	0.6	
	2N2097	SPR	pn-p, ED, ge	*400	750	100	—	40	500	*50	12	*20	20	50	0.5	
	2N2099	SPR	pn-p, ED, ge	*400	750	100	—	25	500	*40	12	*20	35	70	0.6	
	2N2100	SPR	pn-p, ED, ge	*400	750	100	—	40	500	*50	12	*20	20	50	0.5	
	2N2637	MO	npn, PE, si	*400	800	200	4.57	*60	—	*50/150	0.25	*8	*40	*40	0.25	
	2N2538	MO	npn, PE, si	*400	800	200	4.57	*60	—	*100/300	0.25	*8	*40	*40	0.45	
LL 44	2N2539	MO	npn, PE, si	*400	500	200	2.86	*60	—	*50/150	0.25	*8	*40	*40	0.45	SPR
	2N2540	MO	npn, PE, si	*400	500	200	2.86	*60	—	*100/300	0.25	*8	*40	*40	0.45	
	N3345	NA	npn, DM, si	400	500	175	2.8	30	200	80-200	.002	5	—	—	—	
	2N744	TI	npn, PE, si	450	1000	175	6.67	12	200	*40-120	1	*3.5	.003	.009	0.2	
	2N779A	PH	pn-p, MD, ge	450	60	100	.8	*15	30	—	—	1.9	—	—	—	
	2N779B	PH	pn-p, MD, ge	*450	150	100	2.0	15	100	125	0.5	1.4	13	—	0.09	
	2N835	MO	npn, DM, si	450	300	175	2	*25	200	40	0.5	—	—	—	0.3	
	2N846A	PH	pn-p, MD, ge	450	60	100	.8	*15	50	—	1	1.9	—	—	—	
	2N834	MO	npn, DM, si	500	1w	175	6.7	*40	200	5	.01	2.8	.015	.016	—	
	2N2501	MO	pn-p, PE, si	*500	360	200	2.06	*40	—	*50/150	—	*4	—	—	0.2	
LL 45	2N2651	PH	npn, PL, si	*600	1200	200	2.1	*40	500	*50	.012	*2.85	—	.007	.2	US, MIL only TO-5, non saturated
	2N1094	WE	pn-p, D, ge	600	150	100	2.0	30	40	25	5.0	2.5	—	—	—	
	2N559	WE	pn-p, D, ge	750	150	100	0.5	15	50	25	5	—	0.002	0.003	—	
	2N2710	PH	npn, PL, si	*650	1200	200	2.1	*40	500	*65	.012	*2.85	—	.015	.2	
	2N1385	TI	pn-p, MS, ge	750	750	100	8	25	100	30	5	1.3	.001	.002	.4	
	2N768	PH	pn-p, MD, ge	*900	35	100	0.46	*12	100	*40	1	*1.6	—	—	0.09	
	2N769	PH	pn-p, MD, ge	900	35	100	0.46	*12	100	55	0.3	1.5	—	—	0.13	
	2N918	FA	npn, DP, si	*900	300	200	1.71	15	—	*50	0.0003	*1.0	—	—	0.3	
	2N976	PH	pn-p, MD, ge	*900	100	100	1.33	*15	100	*80	3	*1.5	0.007	—	0.12	
	2N797	TI	npn, MS, ge	*1000	150	—	—	7	150	*40	1.0	*4	—	—	0.44	
LL 46	2N2205	RCA	—	1000	—	—	25	200	*20	—	—	—	—	0.025	—	TO-18 SPR-MIL
	2N2206	RCA	—	1000	—	—	25	—	*40	—	—	—	—	—	—	
	2N167A	GE	npn, AJ, ge	—	65	85	—	30	75	30	0.6	—	—	—	—	
	2N240	PH	pn-p, SBT, ge	—	25	85	0.82	*6	15	30	0.5	*4	—	—	—	
	2N269	RCA	pn-p, AJ, ge	—	120	85	—	*25	100	*50	5	—	—	—	0.15	
	2N335B	GE	npn, GJ, si	—	500	175	—	60	25	52	1	11	—	—	—	
	2N336A	GE	npn, GJ, si	—	500	175	—	45	25	75	1	—	—	—	—	
	2N377A	SY	npn, AJ, ge	—	150	100	2	*40	200	20-60	40	—	—	—	—	
	2N388A	SY	npn, AJ, ge	—	150	100	2	25	200	60-180	40	—	—	—	—	
	2N398	RCA	pn-p, AJ, ge	—	50	55	—	*105	100	60	6	—	—	—	0.3	
LL 47	2N399A	GE	pn-p, AJ, ge	—	150	100	—	15	200	70	2	—	—	—	—	Epitaxial CL, PH
	2N438A	SY	npn, AJ, ge	—	150	85	2.5	*25	200	15(min)	10	—	0.7	—	—	
	2N439A	SY	npn, AJ, ge	—	150	85	2.5	*25	200	30(min)	10	—	0.5	—	—	
	2N440A	SY	npn, AJ, ge	—	200	85	3.3	*25	200	40	10	—	0.3	—	—	
	2N496	PH	pn-p, SBT, si	—	150	140	1.3	10	50	5.0	1	6	—	—	0.08	
	2N556	SY	npn, AJ, ge	—	100	85	1.66	20	200	—	25	—	3.5	2	0.5	
	2N557	SY	npn, AJ, ge	—	100	85	1.66	15	200	—	25	—	6.5	2.5	0.5	
	2N558	SY	npn, AJ, ge	—	100	85	1.66	15	200	—	15	—	3.5	2	0.75	
	2N586	RCA	pn-p, AJ, ge	—	250	85	—	45	250	55	8	—	—	—	0.25	
	2N587	SY	npn, AJ, ge	—	150	85	2.5	*40	200	20	10	30	—	—	—	
LL 48	2N597	PH	pn-p, AJ, ge	—	250	100	3.3	45	400	—	5	15	—	—	0.085	Epitaxial, CL
	2N634A	GE	pn-p, AJ, ge	—	150	85	—	20	300	55	6	—	—	—	—	
	2N635A	GE	pn-p, AJ, ge	—	150	85	85	20	300	100	6	—	—	—	—	
	2N636A	GE	pn-p, AJ, ge	—	150	85	—	15	300	190	6	—	—	—	—	
	2N705A	RA	pn-p, EM, ge	—	—	100	—	15	100	*40	3.0	8.0	—	50	0.20	
	2N706	FA	npn, PL, si	—	1200	175	6.7	*25	50	20	—	*5	.02	—	0.6	
	2N707	FA	npn, DP, si	—	1w	175	6.7	28	—	12	.005	5	.02	—	—	
	2N708	SY	npn, DP, si	—	360	200	2.0	*40	—	15	0.025	6	—	25	0.40	
	2N709	AI	npn, P, si	—	—	—	—	*15	—	*75	.001	*3.0	—	—	—	
	2N710A	RA	pn-p, EM, ge	—	150	100	—	15	50	*34	3.0	8.0	—	50	0.50	
LL 49	2N711A	RA	pn-p, EM, ge	—	—	100	—	15	100	*25-150	1.5	6.0	—	120	0.55	Epitaxial
	2N725	SY	pn-p, DM, ge	—	150	100	2	15	200	*25	3	—	0.1	—	—	
	2N781	RA	pn-p, EM, ge	—	—	100	—	15	200	*20	30	—	—	20	0.16	
	2N782	RA	pn-p, EM, ge	—	—	100	—	12	200	*20	30	—	—	35	0.20	
	2N784A	SY	npn, DP, si	—	360	200	2.0	—	200	25	0.025	3.5	20	15	0.19	
	2N794	RCA	pn-p, DM, ge	—	150	85	2.5	13	100	50	1	8	—	—	—	
	2N795	RCA	pn-p, DM, ge	—	150	85	2.5	13	100	50	1	8	—	—	—	
	2N835	CL	npn, DP, si	—	1.2w	175	6.7	25	200	20	0.5	4	0.02	0.035	—	
	2N849/ 2N850/ TI431	TI	npn, EP, si	—	1000	—	—	15	30	*20-60	—	—	—	—	0.6	
	2N850/ TI431	TI	npn, EP, si	—	1000	—	—	15	30	*40-120	—	—	—	—	0.6	

LL continued

Cross Index Key	Type No.	Mfr.	Type	f_{ae} $^{*}f_T$ $^{**}f_{ab}$ (mc)	MAX. RATINGS				CHARACTERISTICS				SWITCHING			Remarks
					P_c (mw)	T_i (°C)	$m_w/°C$	V_{CEO} $^{*}V_{CBO}$ (v)	I_C (ma)	h_{fe} $^{*}h_{FE}$	I_{CO} (μ a)	C_{oe} $^{*}C_{ob}$ (pf)	t_r (μ sec) $^{*}t_{on}$ (nsec)	t_s (μ sec) $^{*}t_{off}$ (nsec)	$V_{ce(sat)}$ (v)	
LL 50	2N914	SY	npn,DP,si	—	360	200	2.0	*40	—	30	0.025	6	40	20	0.7	Epitaxial, CL
	2N917	AI	npn,P,si	—	0.3w	—	—	*30	—	*35	.0001	*1.7	—	—	—	—
	2N1119	PH	npn,SAT,si	—	150	140	1.3	10	50	5.0	.001	6.0	—	—	—	SPR
	2N1122	PH	npn,MA,ge	—	25	85	0.63	12	50	8	5.0	6.0	—	—	0.1	SPR, GI
	2N1122A	PH	npn,MA,ge	—	25	85	0.63	15	50	8	5.0	6.0	—	—	0.1	SPR, GI
	2N1175	GE	npn,AJ,ge	—	200	85	—	25	200	80	6	—	—	—	—	MO, TI
	2N1175A	GE	npn,AJ,ge	—	200	85	—	25	200	80	6	—	—	—	—	TI
	2N1213	RCA	npn,MESA,ge	—	75	85	—	25	100	—	3	—	.015	.05	—	—
	2N1214	RCA	npn,MESA,ge	—	75	85	—	25	100	—	3	—	.015	.05	—	—
	2N1215	RCA	npn,MESA,ge	—	75	85	—	25	100	—	3	—	.015	.05	—	—
LL 51	2N1216	RCA	npn,MESA,ge	—	75	85	—	25	100	—	3	—	.015	.05	—	—
	2N1217	GE	npn,AJ,ge	—	75	85	—	20	25	40	.6	—	—	—	—	—
	2N1252	AI	npn,P,si	—	2w	—	—	*30	—	*35	.10	*20	—	—	—	TI
	2N1253	AI	npn,P,si	—	2w	—	—	*30	—	*45	.10	*20	—	—	—	TI
	2N1277	GE	npn,GJ,si	—	150	150	—	*30	25	20	.001	—	—	—	—	TI
	2N1278	GE	npn,GJ,si	—	150	150	—	*30	25	33	.001	—	—	—	—	TI
	2N1279	GE	npn,GJ,si	—	150	150	—	*30	25	80	.001	—	—	—	—	—
	2N1288	GE	npn,BG,ge	—	75	85	—	10	50	50	2	—	—	—	—	—
	2N1289	GE	npn,MB,ge	—	75	85	—	15	100	50	2	—	—	—	—	—
	2N1299	SY	npn,AJ,ge	—	150	100	2	40	200	35-110	0.1	—	Rise + Fall time = 1.5 usGC			—
LL 52	2N1300	RCA	npn,DM,ge	—	150	85	2.5	13	100	50	1	8	—	—	—	TI
	2N1301	RCA	npn,DM,ge	—	150	85	2.5	13	100	50	1	8	—	—	—	TI
	2N1384	RCA	npn,DR,ge	—	240	85	4	30	500	50	4	—	—	—	—	—
	2N1404	TI	npn,AJ,ge	—	150	85	2.5	25	300	—	3	16	—	—	—	MIL
	2N1411	PH	npn,MA,ge	—	25	85	—	*5	50	*75	0.3	*3.0	—	—	—	—
	2N1413	GE	npn,AJ,ge	—	200	85	—	25	200	36	8	—	—	—	—	TI
	2N1414	GE	npn,AJ,ge	—	200	85	—	25	200	52	8	—	—	—	—	MO, TI
	2N1450	RCA	npn,DR,ge	—	120	85	—	30	100	20	10	—	—	—	—	GI
	2N1473	SY	npn,AJ,ge	—	200	75	4	40	400	25-80	100	—	—	—	—	—
	2N1499	PH	npn,MD,ge	—	30	85	.75	*30	50	8.5	1	*1.3	—	—	—	MIL
LL 53	2N1614	GE	npn,AJ,ge	—	240	85	—	40	300	32	25	—	—	—	—	TI
	2N1683	RCA	npn,DM,ge	—	150	85	2.5	13	100	75	1	8	—	—	—	—
	2N1694	GE	npn,AJ,ge	—	75	85	—	20	25	30	0.6	—	—	—	—	—
	2N1708	RCA	npn,AJ,ge	—	1000	—	—	25	200	*20	—	—	—	0.025	—	GI, SPR
	2N1754	PH	npn,MD,ge	—	50	85	.83	*13	100	—	1	1.5	—	—	—	—
	2N1808	TI	npn,AJ,ge	—	150	85	2.5	25	300	—	5	11	—	—	—	—
	2N1954	RA	npn,AJ,ge	—	375	100	0.2	60	1a	90	10	—	—	—	—	—
	2N1955	RA	npn,AJ,ge	—	375	100	0.2	60	1a	100	10	—	—	—	—	—
	2N1956	RA	npn,AJ,ge	—	375	100	0.2	60	1a	90	—	—	—	—	—	—
	2N1957	RA	npn,AJ,ge	—	375	100	0.2	60	1a	90	10	—	—	—	—	—
LL 54	2N2002	NA	npn,AJ,si	—	250	175	1.67	30	100	—	.001	8	—	—	—	—
	2N2003	NA	npn,AJ,si	—	250	175	1.67	30	100	—	.001	8	—	—	—	—
	2N2004	NA	npn,AJ,si	—	250	175	1.67	50	100	—	.003	8	—	—	—	—
	2N2005	NA	npn,AJ,si	—	250	175	1.67	50	100	—	.0015	8	—	—	—	—
	2N2006	NA	npn,AJ,si	—	250	175	1.67	60	100	—	.002	8	—	—	—	—
	2N2007	NA	npn,AJ,si	—	250	175	1.67	60	100	—	.005	8	—	—	—	—
	2N2175	SSD	npn,AJ,si	—	100	175	0.7	6	50	*80	*0.2	10	—	—	—	—
	2N2176	SSD	npn,AJ,si	—	100	175	0.7	6	50	*80	*0.2	10	—	—	—	—
	2N2282	BE	npn,DAP,ge	—	5	11.0	.67	60	3a	60	50	75pf	2.5	1.5	0.2	—
	2N2283	BE	npn,DAP,ge	—	5	11.0	.67	100	3a	60	50	75pf	2.5	1.5	0.2	—
LL 55	2N2284	BE	npn,DAP,ge	—	5	110	.67	200	3a	60	50	75pf	2.5	1.5	0.2	—
	2N2368	AI	npn,P,si	—	1.2w	—	—	*40	—	*40	.01	*2.5	—	—	—	—
	2N2369	AI	npn,P,si	—	1.2w	—	—	*40	—	*75	.01	*2.5	—	—	—	—
	2N2378	SPR	npn,SP,si	—	150	140	1.3	*10	50	5.0	0.001	6.0	—	—	—	—
	2N2713	GE	npn,PE,si	—	200	100	2.67	*18	200	*30-90	0.5	—	85	85	0.30	—
	2N2714	GE	npn,PE,si	—	200	100	2.67	*18	200	75-225	0.5	—	85	85	0.30	—
	4D20	GE	npn,GD,si	—	—	150	1.5	*40	25	*15-50	1	*4	0.1	0.1	1.5	—
	4D21	GE	npn,GD,si	—	—	150	1.5	*40	25	*40-135	1	4	0.1	0.1	1.5	—
	4D22	GE	npn,GD,si	—	—	150	1.5	*40	25	*120-250	1	*4	0.1	0.1	1.5	—
	4D24	GE	npn,GD,si	—	—	125	1.25	*40	25	*15-50	1	*4	—	—	—	—
LL 56	4D25	GE	npn,GD,si	—	—	125	1.25	*40	25	*40-135	1	*4	—	—	—	—
	4D26	GE	npn,GD,si	—	—	125	1.25	*40	25	*120-250	1	*4	—	—	—	—
	10B551	GE	npn,PE,si	—	100	125	1.0	*40	—	*30-120	50	*6	45	25	0.25	—
	10B553	GE	npn,PE,si	—	100	125	1.0	*40	—	*30-120	0.5	*6	—	60	0.4	—
	10B555	GE	npn,PE,si	—	100	125	1.0	*25	—	*20	0.5	*6	—	25	0.6	—
	10B556	GE	npn,PE,si	—	100	125	1.0	*25	—	*20-60	0.5	*6	—	25	0.6	—
	SST610	SSE	npn	—	500	—	0.25	14v	500	10,000	—	35pf	—	—	1.5v	T05 Package

SILICON FIELD EFFECT TRANSISTORS



2N2386



2N2794

These P-channel diffused silicon transistors embody all the desirable characteristics inherent in the field effect design—low input capacitance and high impedance. Use of an S-shaped gate configuration contributes to the exceptionally low capacitance ■ Tung-Sol's wide application experience with injection transistors and vacuum tubes—features of which are combined in the field effect transistor—is an important consideration for anyone seeking a competent source of this advanced semiconductor device ■ Write for complete technical information. Tung-Sol Electric Inc., Newark 4, N. J. TWX: 201-621-7977

TYPICAL ELECTRICAL CHARACTERISTICS (25°C)

	TEST	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT
2N2386	Drain Current	I_{DSS}	$V_{DS} = -10V, V_{GS} = 0$		3.0		mA
	Forward Transadmittance	Y_{FS}	$V_{DS} = -10V, V_{GS} = 0$ $f = 1Kc$	1000		3000	μmho
2N2794	Drain Current	I_{DSS}	$V_{DS} = -10V, V_{GS} = 0$	1.5		5	mA
	Forward Transadmittance	Y_{FS}	$V_{DS} = -10V, V_{GS} = 0$ $f = 1Kc$	1000		3000	μmho



TUNG-SOL

0.5 AMP INTERDIGITATED PASSIVATED SILICON PLANAR EPITAXIAL TRANSISTORS

2N2217

2N2218

2N2219

(TO-5)

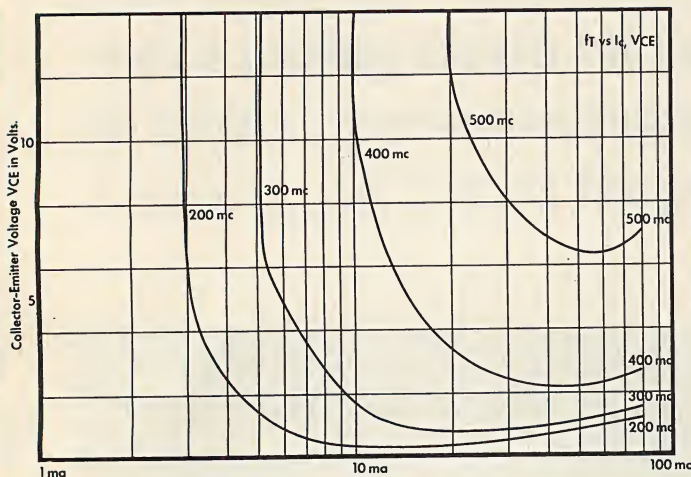
2N2220

2N2221

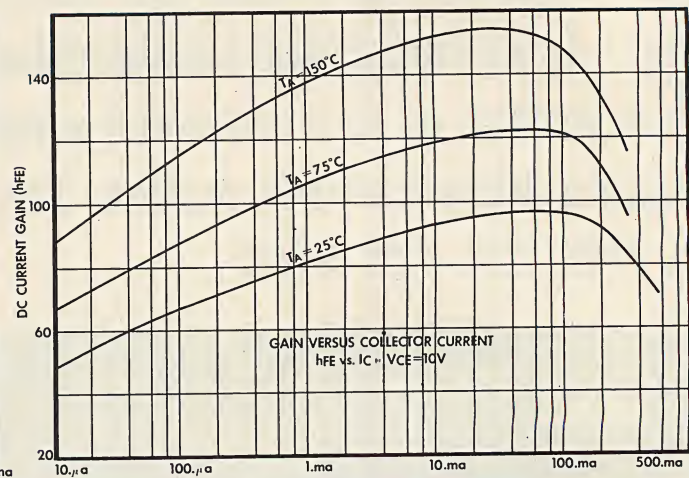
2N2222

(TO-18)

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BANDWIDTH PRODUCT (f_T)**



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vs COLLECTOR CURRENT**



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HIGH LEVEL SWITCHING

Generally types rated at one watt and above. In order of f_{ae} (f_{ab} or f_T where noted).

Cross Index Key	Type No.	Mfr.	Type	f_{ae} $*f_T$ $**f_{ab}$ (kc)	MAX. RATINGS				CHARACTERISTICS					SWITCHING			Remarks
					P_c (w)	T_j (°C)	$w/°C$	V_{CEO} $*V_{CBO}$ (v)	I_C (a)	h_{fe} $*h_{FE}$	I_{CO} (ma) (* μ a)	Powr. Gain (db)	Powr. Out (w)	t_r (μ sec)	t_s (μ sec)	$V_{ce(sat)}$ (μ a)	
HL 1	2N1830	WH	npn,AJ,si	0.014	250	175	2.22	*50	30	*10	5	—	8	3.0	0.87		
	2N1831	WH	npn,AJ,si	0.014	250	175	2.22	*100	30	*10	5	—	8	3.0	0.87		
	2N1832	WH	npn,AJ,si	0.014	250	175	2.22	*150	30	*10	5	—	8	3.0	0.87		
	2N1833	WH	npn,AJ,si	0.014	250	175	2.22	*200	30	*10	5	—	8	3.0	0.87		
	2N2109	WH	npn,AJ,si	0.014	250	175	2.22	*50	30	*10	5	—	4	1.3	0.4	0.4	
HL 2	2N2110	WH	npn,AJ,si	0.014	250	175	2.22	*100	30	*10	5	—	4	1.3	0.4	0.4	
	2N2111	WH	npn,AJ,si	0.014	250	175	2.22	*150	30	*10	5	—	4	1.3	0.4	0.4	
	2N2112	WH	npn,AJ,si	0.014	250	175	2.22	*200	30	*10	5	—	4	1.3	0.4	0.4	
	2N2113	WH	npn,AJ,si	0.014	250	175	2.22	*250	30	*10	5	—	4	1.3	0.4	0.4	
	2N2114	WH	npn,AJ,si	0.014	250	175	2.22	*300	30	*10	5	—	4	1.3	0.4	0.4	
	2N2130	WH	npn,AJ,si	0.014	250	175	2.22	*50	30	*10	5	—	8	3.0	0.87		
	2N2131	WH	npn,AJ,si	0.014	250	175	2.22	*100	30	*10	5	—	8	3.0	0.87		
	2N2132	WH	npn,AJ,si	0.014	250	175	2.22	*150	30	*10	5	—	8	3.0	0.87		
	2N2133	WH	npn,AJ,si	0.014	250	175	2.22	*200	30	*10	5	—	8	3.0	0.87		
	2N2116	WH	npn,AJ,si	0.0145	250	175	2.22	*50	30	*10	5	—	5.6	1.4	0.63	1.4	
HL 3	2N2117	WH	npn,AJ,si	0.0145	250	175	2.22	*100	30	*10	5	—	5.6	1.4	0.63	0.63	
	2N2118	WH	npn,AJ,si	0.0145	250	175	2.22	*150	30	*10	5	—	5.6	1.4	0.63	0.63	
	2N2119	WH	npn,AJ,si	0.0145	250	175	2.22	*200	30	*10	5	—	5.6	1.4	0.63	0.63	
	2N2123	WH	npn,AJ,si	0.016	250	175	2.22	*50	30	*10	5	—	6.4	1.5	0.74	0.74	
	2N2124	WH	npn,AJ,si	0.016	250	175	2.22	*100	30	*10	5	—	6.4	1.5	0.74	0.74	
	2N2125	WH	npn,AJ,si	0.016	250	175	2.22	*150	30	*10	5	—	6.4	1.5	0.74	0.74	
	2N2126	WH	npn,AJ,si	0.016	250	175	2.22	*200	30	*10	5	—	6.4	1.5	0.74	0.74	
	2N1238	HU	pnnp,FJ,si	0.8	1.0	200	—	15	0.5	14	0.1	—	—	—	—	—	
	2N1239	HU	pnnp,FJ,si	0.8	1.0	200	—	15	0.5	32	0.1	—	—	—	—	—	
	2N1240	HU	pnnp,FJ,si	1.0	1.0	200	—	35	0.5	14	0.1	—	—	—	—	—	
HL 4	2N1241	HU	pnnp,FJ,si	1.0	1.0	200	—	35	0.5	24	0.1	—	—	—	—	—	
	2N1242	HU	pnnp,FJ,si	1.0	1.0	200	—	65	0.5	14	0.1	—	—	—	—	—	
	2N1243	HU	pnnp,FJ,si	1.0	1.0	200	—	65	0.5	24	0.1	—	—	—	—	—	
	2N1244	HU	pnnp,FJ,si	1.2	1.0	200	—	110	0.5	14	0.1	—	—	—	—	—	
	2N1073	BE	pnnp,DJ,ge	1.5	35	100	1.5	*40	10	*20-6	2.0	—	—	—	—	1.0	DE
	2N1073A	BE	pnnp,DJ,ge	1.5	35	100	1.5	*80	10	*20-6	2.0	—	—	—	—	1.0	DE
	2N1073B	BE	pnnp,DJ,ge	1.5	35	100	1.5	*120	10	*20-6	2.0	—	—	—	—	1.0	DE
	B-1085	BE	pnnp,DJ,ge	1.5	60	100	1.0	120	10	5a	2.0	—	—	—	—	0.75	
	OC22	AMP	pnnp,PADT,ge	2.5	10	75	—	*32	1	150	30	—	—	—	—	—	
	OC23	AMP	pnnp,PADT,ge	2.5	10	75	—	*40	1	150	30	—	—	—	—	—	
HL 5	OC24	AMP	pnnp,PADT,ge	2.5	10	75	—	*32	1	150	30	—	—	—	—	—	
	2N1518	DE	pnnp,AJ,ge	4	70	100	1.2	*50	25	15-60	100	—	40	20	7	0.3	SO
	2N1519	DE	pnnp,AJ,ge	4	70	100	1.2	*80	25	15-60	100	—	40	20	7	0.3	SO
	2N1520	DE	pnnp,AJ,ge	4	70	100	1.2	*50	35	17-18	100	—	40	20	7	0.3	
	2N1521	DE	pnnp,AJ,ge	4	70	100	1.2	*80	35	25-100	100	—	40	20	7	0.3	SO
	2N1522	DE	pnnp,AJ,ge	4	70	100	1.2	*50	50	25-100	100	—	40	20	7	0.3	SO
	2N1523	DE	pnnp,AJ,ge	4	70	100	1.2	*80	50	25-100	100	—	40	20	7	0.3	SO
	2N297	BE	pnnp,AJ,ge	5	35	90	1.5	50	5	—	3	—	—	—	—	1.02	
	2N297A	CL	pnnp,AJ,ge	5	12	95	2.0	*60	5	—	3	—	—	—	—	1.0	BE, DE, MO, SO
	2N618	CL	pnnp,AJ,ge	5	14	90	1.5	*80	3	—	3	—	—	—	—	0.8	MO, BE
HL 6	2N375	CL	pnnp,AJ,ge	7	—	95	—	*80	3	—	3	—	—	—	—	1.0	MO, BE
	2N378	TS	pnnp,AJ,ge	7	50	100	1.2	20	5	30	0.5	—	—	—	—	—	BE
	2N379	CL	pnnp,AJ,ge	7	5	85	0.3	80	3	—	5	—	—	—	—	1	TS, BE
	2N380	TS	pnnp,AJ,ge	7	50	100	0.8	30	5	—	0.5	—	—	—	—	—	BE, CL
	2N458	TI	pnnp,AJ,ge	7	50	95	0.72	80	5	—	1	—	—	12	12.5	0.24	CL, BE
	2N459	TS	pnnp,AJ,ge	7	50	100	0.8	60	5	—	0.5	—	—	—	—	—	BE, CL
	2N1011	DE	pnnp,AJ,ge	7	70	100	0.1	*80	5	—	100	—	—	5	2	0.3	2N1011 Sig. C., MO, BE, CL
	2N2230	WH	npn,AJ,si	7	150	2.0	*50	10	*400	10	—	—	12	3.5	2.2	—	
	2N2231	WH	npn,AJ,si	7	150	150	2.0	*100	10	*400	10	—	—	12	3.5	2.2	
	2N2232	WH	npn,AJ,si	7	150	150	2.0	*150	10	*400	10	—	—	12	3.5	2.2	
HL 7	2N2233	WH	npn,AJ,si	7	150	150	2.0	*200	10	*400	10	—	—	12	3.5	2.2	
	2N456A	DE	pnnp,AJ,ge	10	94	100	1.2	*40	7	—	0.065	—	—	10	5	—	TI, BE, CL
	2N457A	DE	pnnp,AJ,ge	10	94	100	1.2	*60	0.065	—	0.065	—	—	10	5	—	TI, BE, CL
	2N458A	DE	pnnp,AJ,ge	10	94	100	1.2	*80	7	—	0.065	—	—	10	5	—	TI, BE, CL
	2N1038	TI	pnnp,AJ,ge	10	20	100	0.27	40	3	33	50	—	—	—	—	—	BE, KF
	2N1039	TI	pnnp,AJ,ge	10	20	100	0.27	60	3	33	50	—	—	—	—	—	BE, KF
	2N1040	TI	pnnp,AJ,ge	10	20	100	0.27	80	3	33	50	—	—	—	—	—	TS, TI, RCA, MO, SO, BE
	2N1358	DE	pnnp,AJ,ge	10	150	100	2	*80	15	—	0.1	—	40	15	5	0.3	TS, RCA, MO, SO, BE
	2N1412	DE	pnnp,AJ,ge	10	150	100	2	*100	15	—	100	—	40	15	5	0.3	SO, MO
	2N1970	DE	pnnp,AJ,ge	10	150	100	2	*160	15	—	0.1	—	—	10	5	—	

HL continued

Cross Index Key	Type No.	Mfr.	Type	f _{ae} *f _T ***f _{ab} (kc)	MAX. RATINGS			CHARACTERISTICS					SWITCHING			Remarks	
					P _c (w)	T _i (°C)	W/°C	V _{CEO} V _{CBO} (v)	I _C (a)	h _{FE} *h _{FE}	I _{CO} (ma) (*μA)	Powr. Gain (db)	Powr. Out (w)	t _r (μsec)	t _s (μsec)		V _{ce(sat)} (μA)
HL 8	2N2226	WH	npn, AJ, si	10	150	150	2.0	*50	10	*100	10	—	—	8	3	2.2	
	2N2227	WH	npn, AJ, si	10	150	150	2.0	*100	10	*100	10	—	—	8	3	2.2	
	2N2228	WH	npn, AJ, si	10	150	150	2.0	*150	10	*100	10	—	—	8	3	2.2	
	2N2564	KF	ppn, AJ, ge	10	20	100	.27	*40	3	*25	*40	—	—	—	—	.5	
	2N2565	KF	ppn, AJ, ge	10	20	100	.27	*60	3	*25	*40	—	—	—	—	.5	
	2N2566	KF	ppn, AJ, ge	10	20	100	.27	*80	3	*25	*40	—	—	—	—	.5	
HL 9	2N2567	KF	ppn, AJ, ge	10	20	100	.27	*100	3	*25	*40	—	—	—	—	.5	
	2N1809	WH	npn, AJ, si	14	250	175	2.22	*50	30	*10	5	—	—	4	1.3	0.4	
	2N1810	WH	npn, AJ, si	14	250	175	2.22	*100	30	*10	5	—	—	4	1.3	0.4	
	2N1811	WH	npn, AJ, si	14	250	175	2.22	*150	30	*10	5	—	—	4	1.3	0.4	
	2N1812	WH	npn, AJ, si	14	250	175	2.22	*200	30	*10	5	—	—	4	1.3	0.4	
	2N1813	WH	npn, AJ, si	14	250	175	2.22	*250	30	*10	5	—	—	4	1.3	0.4	
HL 10	2N1814	WH	npn, AJ, si	14	250	175	2.22	*300	30	*10	5	—	—	4	1.3	0.4	
	2N2739	WH	npn, AJ, si	14	200	175	2.0	*100	20	*10	15	—	—	9	2	0.4	
	2N2740	WH	npn, AJ, si	14	200	175	2.0	*100	20	*10	15	—	—	9	2	0.4	
	2N2741	WH	npn, AJ, si	14	200	175	2.0	*150	20	*10	15	—	—	9	2	0.4	
	2N2742	WH	npn, AJ, si	14	200	175	2.0	*200	20	*10	15	—	—	9	2	0.4	
	2N2757	WH	npn, AJ, si	14	200	175	2.0	*50	30	*10	15	—	—	9	2	0.4	
HL 11	2N2758	WH	npn, AJ, si	14	200	175	2.0	*100	30	*10	15	—	—	9	2	0.4	
	2N2759	WH	npn, AJ, si	14	200	175	2.0	*150	30	*10	15	—	—	9	2	0.4	
	2N2760	WH	npn, AJ, si	14	200	175	2.0	*200	30	*10	15	—	—	9	2	0.4	
	2N2761	WH	npn, AJ, si	14	200	175	2.0	*250	30	*10	15	—	—	9	2	0.4	
	2N1816	WH	npn, AJ, si	14.5	250	175	2.22	*50	30	*10	5	—	—	5.6	1.4	0.63	
	2N1817	WH	npn, AJ, si	14.5	250	175	2.22	*100	30	*10	5	—	—	5.6	1.4	0.63	
HL 12	2N1818	WH	npn, AJ, si	14.5	250	175	2.22	*150	30	*10	5	—	—	5.6	1.4	0.63	
	2N1819	WH	npn, AJ, si	14.5	250	175	2.22	*200	30	*10	5	—	—	5.6	1.4	0.63	
	2N2745	WH	npn, AJ, si	14.5	200	175	2.0	*50	20	*10	15	—	—	12	1.3	0.63	
	2N2746	WH	npn, AJ, si	14.5	200	175	2.0	*100	20	*10	15	—	—	12	1.3	0.63	
	2N2747	WH	npn, AJ, si	14.5	200	175	2.0	*150	20	*10	15	—	—	12	1.3	0.63	
	2N2748	WH	npn, AJ, si	14.5	200	175	2.0	*200	20	*10	15	—	—	12	1.3	0.63	
HL 13	2N2763	WH	npn, AJ, si	14.5	200	175	2.0	*50	30	*10	15	—	—	12	1.3	0.63	
	2N2764	WH	npn, AJ, si	14.5	200	175	2.0	*100	30	*10	15	—	—	12	1.3	0.63	
	2N2765	WH	npn, AJ, si	14.5	200	175	2.0	*150	30	*10	15	—	—	12	1.3	0.63	
	2N2766	WH	npn, AJ, si	14.5	200	175	2.0	*200	30	*10	15	—	—	12	1.3	0.63	
	2N1046	TI	ppn, AD, ge	15	150	100	2	100	10	40	10	—	—	—	—	1.0	
	2N1046A	TI	ppn, AD, ge	15	150	100	2	130	10	20	10	—	—	—	—	—	
HL 14	2N1046B	TI	ppn, AD, ge	15	150	100	2	130	10	10	10	—	—	—	—	—	
	2N1823	WH	npn, AJ, si	16	250	175	2.22	*50	30	*10	5	—	—	6.4	1.5	0.74	
	2N1824	WH	npn, AJ, si	16	250	175	2.22	*100	30	*10	5	—	—	6.4	1.5	0.74	
	2N1825	WH	npn, AJ, si	16	250	175	2.22	*150	30	*10	5	—	—	6.4	1.5	0.74	
	2N1826	WH	npn, AJ, si	16	250	175	2.22	*200	30	*10	5	—	—	6.4	1.5	0.74	
	2N2751	WH	npn, AJ, si	16	200	175	2.0	*50	20	*10	15	—	—	16	1.5	0.74	
HL 15	2N2752	WH	npn, AJ, si	16	200	175	2.0	*100	20	*10	15	—	—	16	1.5	0.74	
	2N2753	WH	npn, AJ, si	16	200	175	2.0	*150	20	*10	15	—	—	16	1.5	0.74	
	2N2754	WH	npn, AJ, si	16	200	175	2.0	*200	20	*10	15	—	—	16	1.5	0.74	
	2N2769	WH	npn, AJ, si	16	200	175	2.0	*50	30	*10	15	—	—	—	—	—	
	2N2770	WH	npn, AJ, si	16	200	175	2.0	*100	30	*10	15	—	—	16	1.5	0.74	
	2N2771	WH	npn, AJ, si	16	200	175	2.0	*150	30	*10	15	—	—	16	1.5	0.74	
HL 16	2N2772	WH	npn, AJ, si	16	200	175	2.0	*200	30	*10	15	—	—	16	1.5	0.74	
	2N1611	DE	ppn, AJ, ge	17	7.5	100	0.1	*60	1.5	—	10	—	0.4w	3	1	0.3	
	2N1612	DE	ppn, AJ, ge	17	7.5	100	0.1	*60	1.5	—	10	—	0.4w	3	1	0.3	
	2N1015	WH	npn, FJ, si	25	150	150	1.4	*30	7.5	8	10	—	—	5	1	1.5	
	2N1015A	WH	npn, FJ, si	25	150	150	1.4	*60	7.5	8	10	—	—	5	1	1.5	
	2N1015B	WH	npn, FJ, si	25	150	150	1.4	*100	7.5	8	10	—	—	5	1	1.5	
HL 17	2N1015C	WH	npn, FJ, si	25	150	150	1.4	150	7.5	8	10	—	—	5	1	1.5	
	2N1015D	WH	npn, FJ, si	25	150	150	1.4	*200	7.5	8	10	—	—	5	1	1.5	
	2N1015E	WH	npn, FJ, si	25	150	150	1.4	*250	7.5	8	10	—	—	5	1	1.5	
	2N1016	WH	npn, FJ, si	25	150	150	1.4	30	7.5	8	10	—	—	5	1	1.5	
	2N1016A	WH	npn, FJ, si	25	150	150	1.4	60	7.5	8	10	—	—	5	1	1.5	
	2N1016B	WH	npn, FJ, si	25	150	150	1.4	100	7.5	8	10	—	—	5	1	1.5	
HL 18	2N1016C	WH	npn, FJ, si	25	150	150	1.4	150	7.5	8	10	—	—	5	1	1.5	
	2N1016D	WH	npn, FJ, si	25	150	150	1.4	*200	7.5	8	10	—	—	5	1	1.5	
	2N1016E	WH	npn, FJ, si	25	150	150	1.4	*250	7.5	8	10	—	—	5	1	1.5	
	2N1971	DE	ppn, AJ, ge	25	50	100	0.7	*80	4	—	0.02	—	—	—	—	—	
	151-04	WH	npn, AJ, si	25	100	150	1.4	*80	6.0	*11	10	—	—	8	2	0.6	
	151-05	WH	npn, AJ, si	25	100	150	1.4	*100	6.0	*11	10	—	—	8	2	0.6	
HL 19	151-06	WH	npn, AJ, si	25	100	150	1.4	*120	6.0	*11	10	—	—	8	2	0.6	
	151-07	WH	npn, AJ, si	25	100	150	1.4	*140	6.0	*11	10	—	—	8	2	0.6	
	151-08	WH	npn, AJ, si	25	100	150	1.4	*160	6.0	*11	10	—	—	8	2	0.6	
	151-09	WH	npn, AJ, si	25	100	150	1.4	*180	6.0	*11	10	—	—	8	2	0.6	
	151-10	WH	npn, AJ, si	25	100	150	1.4	*200	6.0	*11	10	—	—	8	2	0.6	
	151-11	WH	npn, AJ, si	25	100	150	1.4	*220	6.0	*11	10	—	—	8	2	0.6	

Available *ONLY* from **"KEMET"**

100v

**75
60
50
35
20
15
10**

J-SERIES (POLAR TYPE) SOLID TANTALUM CAPACITORS

0.1 to 2.7 Microfarads

**Temperature Range:
100v at 85°C. • 67v at 125°C.**

KEMET was first to bring you high-voltage solid tantalums—50, 60, and 75 volts—three big contributions in 2½ years!

Now KEMET pioneers with true *quantity* production of 100-volt units—in hermetically sealed A and B case sizes conforming to Style CS12 and Style CS13 in MIL-C-26655A.

These new 100-volt capacitors show the same resistance to shock and vibration, the same stability of electrical parameters with temperature change, and the same low levels of leakage current as the lower-voltage J-Series units. Also, the maximum dissipation factor has been reduced to 3%—the lowest ever—or one-half the usual J-Series m.d.f.

Today's total J-Series provides microfarad values from .0047 to 330; working voltages of 6, 10, 15, 20, 35, 50, 60, 75, and 100 volts—offering standard E.I.A. values with ± 5 , 10, and 20% tolerances.

KEMET is your assurance of maximum reliability, since KEMET controls the characteristics of tantalum powder from mine to finished product! For technical data on any member of the J-Series, write to:

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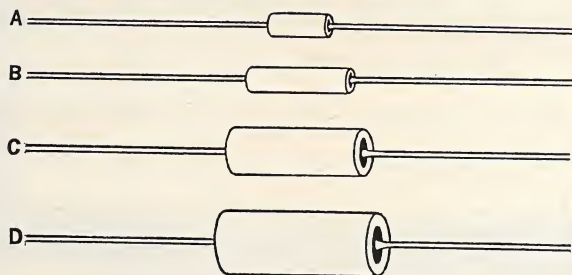


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J-Series • Actual Size

Microfarads: Temperatures:
.0047 to 330 -80 to +125°C.

4 cases conform to MIL-C-26655A.
100v units presently available only in military cases A and B.



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ON READER-SERVICE CARD CIRCLE 470

SSPI

TN SERIES

CIRCLE 471 ON READER-SERVICE CARD

PANCAKE TO-5

TO-5

 $\frac{7}{16}$ HEX
LOW PROFILE $\frac{7}{16}$ HEX-LUG**PASSIVATED
PLANAR
EPITAXIAL****HIGH
RELIABILITY
WIDE RANGE
PERFORMANCE
CIRCUIT
MINIATURIZATION**

SILICON NPN POWER TRANSISTORS

A NEW GENERATION OF MINIATURE SILICON POWER TRANSISTORS FROM SSPI OFFERING SIGNIFICANTLY IMPROVED PERFORMANCE, "DESIGNED IN" RELIABILITY, AND REDUCED SIZE . . . AT COMPETITIVE PRICES.

Type	Package	Power Dissipation (Case Temp.)	Voltage Ratings		Operating Current Range	$V_{ce(sat)}@I_c$	Minimum h_{FE}			Maximum $I_{c(sat)}@V_{ce}$	Typical f_t Mc	Typical Saturated Switching Times nanoseconds			
			V_{ce0}	V_{ce0} (Sus)			50mA	1A	5A			$I_c=1A \quad I_{B1}=I_{B2}=100mA$			
					Delay						Rise	Storage	Fall		
2N2849	PANCAKE TO-5	5W @ 125°C	100	80	Up to 5A	0.4V @ 1A	50	100	—	0.1μA @ 80V	80	20	40	350	50
2N2850		5W @ 125°C	100	80	"	0.25V @ 1A	25	40	—	0.1μA @ 80V	60	20	50	200	50
2N2851		5W @ 125°C	100	80	"	0.4V @ 1A	25	40	—	0.1μA @ 80V	60	20	50	200	50
2N2852		5W @ 125°C	100	80	"	0.4V @ 1A	15	20	—	0.1μA @ 80V	40	20	60	150	50
2N2853		5W @ 125°C	60	40	"	1.5V @ 5A	—	40	20	0.1μA @ 40V	60	20	50	250	50
2N2854		5W @ 125°C	60	40	"	0.4V @ 1A	50	100	—	0.1μA @ 40V	80	20	40	350	50
2N2855		5W @ 125°C	60	40	"	0.4V @ 1A	25	40	—	0.1μA @ 40V	60	20	50	200	50
2N2856		5W @ 125°C	60	40	"	0.4V @ 1A	15	20	—	0.1μA @ 40V	40	20	60	150	50
2N2657	TO-5	4W @ 100°C	80	50	"	0.5V @ 1A	—	40	15	0.1μA @ 60V	40	20	50	600	90
2N2658	TO-5	4W @ 100°C	100	70	"	0.5V @ 1A	—	40	15	0.1μA @ 60V	40	20	50	600	90

All of the above types optionally available in any of the 4 packages shown.

In addition to the above Preferred Types, the following Types are also available from SSPI:

2N497, 2N498 • 2N545, 2N546, 2N547, 2N548, 2N549, 2N551 • 2N656, 2N657 • 2N1052, 2N1054, 2N1055
2N1116, 2N1117 • 2N1714, 2N1715, 2N1716, 2N1717, 2N1718 2N1719, 2N1720, 2N1721

SOLID STATE

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HL *continued*

Cross Index Key	Type No.	Mfr.	Type	f _{ae} *f _T **f _{ab} (mc)	MAX. RATINGS				CHARACTERISTICS				SWITCHING			Remarks	
					P _c (w)	T _i (°C)	w/°C	V _{CEO} *V _{CBO} (v)	I _C (a)	h _{fe} *h _{FE}	I _{CO} (ma) (*μa)	Pow _r . Gain (db)	Pow _r . Out (w)	t _r (μsec)	t _s (μsec)		V _{ce(sat)} (μg)
HL 20	STC1103	STC	npn,DJ,si	1.0	85	200	0.425	60	6	25-75	0.025	—	—	—	—	—	Infinite heat sink AMF AMF
	STC1104	STC	npn,DJ,si	1.0	85	200	0.425	100	6	25-75	0.025	—	—	—	—	—	
	2N673	PH	pnnp,AJ,ge	*1.1	1.0	85	—	*40	2	*100	*20	—	—	—	—	0.3	
	2N424A	STC	npn,DM,si	2	85	200	0.4	60	3	12-60	10	—	—	—	—	—	
	2N1620	STC	npn,DM,si	2	85	200	0.425	100	5	15-75	1	—	—	—	—	—	
	2N1701	STC	npn,DM,si	2	25	200	0.125	60	2.5	20-80	0.1	—	—	—	—	—	AMF
	2N1702	STC	npn,DM,si	2	75	200	0.375	60	5	15-60	0.2	—	—	—	—	—	
2N1768	STC	npn,DM,si	2	40	200	0.2	80	3	35-100	.015	—	—	—	—	—		
2N1769	STC	npn,DM,si	2	40	200	0.2	100	3	35-100	.015	—	—	—	—	—	0.9	
2N551	TR	npn,DJ,si	3	3	200	0.5	60	—	20-80	1.2	—	—	1.2	0.3	—		
HL 21	2N552	TR	npn,DJ,si	3	3	200	0.5	30	—	20-80	1.2	—	—	1.2	0.3	0.9	
	2N1055	TR	npn,DJ,si	3	3	200	0.045	100	—	20-80	0.001	—	—	—	—	—	
	2N547	TR	npn,DJ,si	4	5	200	0.5	60	—	20-80	1.2	—	—	0.7	0.2	3.0	
	2N548	TR	npn,DJ,si	4	5	200	0.5	30	—	20-80	0.5	—	—	0.7	0.2	2.0	
	2N549	TR	npn,DJ,si	4	5	200	0.5	60	—	20-80	0.5	—	—	0.7	0.2	1.5	
	2N550	TR	npn,DJ,si	4	5	200	0.5	30	—	20-80	0.5	—	—	0.7	0.2	1.5	
	2N1117	TR	npn,DJ,si	4	5	200	0.5	60	—	40	0.04	—	—	0.7	0.2	1.5	
	2N1116	TR	npn,DJ,si	6	5	200	0.5	60	—	40	1.2	—	—	0.7	0.2	3.0	
	2N1173	WE	npn,AJ,ge	6	—	100	3.33	*35	0.2	80	0.004	—	—	—	—	—	
ST402	TR	npn,DJ,si	6	50	200	0.33	*60	3	30	20	—	—	0.25	0.5	6		
HL 22	ST403	TR	npn,DJ,si	6	50	200	0.33	*45	3	30	20	—	—	0.25	0.5	5	
	2N1174	WE	pnnp,AJ,ge	7	—	100	3.33	*35	0.2	85	0.005	—	—	—	—	—	
	2N545	TR	npn,DJ,si	8	5	200	0.5	60	—	15	1.2	—	—	0.3	0.15	3.0	
	2N546	TR	npn,DJ,si	8	5	200	0.5	30	—	15	0.5	—	—	0.3	0.15	2.0	
	2N1052	TR	npn,DJ,si	8	5	200	.045	*60	—	15	0.001	—	—	—	—	—	
	2N1212	TR	npn,DJ,si	10	85	200	0.27	*60	3000	12-60	1000	—	—	—	—	3.5	
	2N2229	WH	npn,AJ,si	*10	150	150	2.0	*200	10	*100	10	—	—	8	3	2.2	
	2N1054	TR	npn,DJ,si	12	5	200	.045	*125	—	20-80	.0004	—	—	—	—	—	
	2N1208	TR	npn,DJ,si	12	85	200	0.27	*60	5	15	1.0	—	—	0.25	—	3	
2N1209	TR	npn,DJ,si	12	85	200	0.27	*45	5	20	2.0	—	—	0.25	—	3		
HL 23	2N1250	TR	npn,DJ,si	12	85	200	0.27	60	5	15	1.0	—	—	0.25	—	3	STC
	ST401	TR	npn,DJ,si	12	85	200	0.27	*45	5	20	2.0	—	—	0.25	—	3	
	2N1907	TI	pnnp,AD,ge	*20	150	—	—	100	20	*10	0.3	—	—	—	—	1.7	
	2N1908	TI	pnnp,AD,ge	*20	150	—	—	130	20	*10	0.3	—	—	—	—	1.7	US, MIL only
	2N1072	WE	npn,DD,si	30	12	150	65	75	1	13	0.1	—	—	0.05	0.05	—	
	2N1041	TI	npn,AJ,ge	33	20	100	0.27	100	3	33	50	—	—	—	—	—	
	2N498	FA	npn,DP,si	*50	4.0	200	22.8	100	—	*27	*0.0004	—	—	—	—	—	BE, KF
	2N978	FA	pnnp,DD,si	*50	1.75	150	0.010	20	—	*40	*0.1	—	—	—	—	—	
	2N1893	FA	npn,DP,si	*50	3	200	17.2	—	—	—	.0003	—	—	—	—	—	
2N1984	FA	npn,DM,si	*50	2	150	16.0	25	—	40	1.0	—	—	—	—	—	GI, TI RA	
HL 24	2N1985	FA	npn,DM,si	*50	2	150	16.0	25	—	40	1.0	—	—	—	—	—	RA RA
	2N1986	FA	npn,DM,si	*50	2.0	150	16.0	25	—	100	1.0	—	—	—	—	—	
	2N1987	FA	npn,DD,si	*50	2.0	150	16.0	25	—	50*	1.0	—	—	—	—	—	
	2N1988	FA	npn,DM,si	*50	2	150	16.0	45	—	70	1.0	—	—	—	—	—	RA GI, RA
	2N1989	FA	npn,DM,si	*50	2	150	16.0	60	—	40	1.0	—	—	—	—	—	
	2N1991	FA	pnnp,DM,si	*50	2.0	150	16.0	*30	—	40	.005*	—	—	—	—	—	
	2N656	FA	pnnp,DP,si	*60	4.0	200	0.0228	60	—	*60	*0.004	—	—	—	—	—	TR Microbloc
	2N657	FA	npn,DP,si	*60	4.0	200	0.0228	—	100	—	*60	*0.0004	—	—	—	—	
	2N912	FA	npn,DP,si	*60	1.8	200	10.3	60	—	42	.0003μa	—	—	—	—	—	
2N1975	FA	npn,DP,si	*60	3	200	17.2	60	—	42	.003μa	—	—	—	—	.24		
2N1978	FA	npn,DP,si	*60	30	200	0.17	40	—	40	*0.001	—	—	—	—	—		
HL 25	2N2102	RCA	npn,PL,si	*60	5	—	—	120	10	*20	—	—	—	—	—	—	
	2N2270	RCA	npn,PL,si	*60	5	—	—	60	10	*35	—	—	—	—	—	—	
	RT5202	RA	npn,DD,si	60	5	175	0.033	175	0.5	50	0.001	—	—	—	—	—	
	RT5230	RA	npn,DD,si	60	2	175	0.013	30	0.5	50	—	—	—	—	—	—	
	TA6200	FA	npn,DP,si	*60	4.0	200	0.0228	—	—	*80	—	—	—	—	—	—	
	2N526	SY	pnnp,AJ,ge	64	225	100	3	*45	500	10	—	—	3	—	—	—	
	2N1925	GE	pnnp,AJ,ge	64	225	85	—	40	500	4	—	—	—	—	—	—	
	2N698	FA	npn,DP,si	*70	3.0	200	22.8	*60	—	40	.0003	—	—	0.08	—	—	
	2N721	FA	pnnp,DP,si	*70	1.5	175	10.0	35	—	30	*0.01	—	—	—	—	—	
HL 26	2N870	FA	npn,DP,si	*70	1.8	200	10.3	60	—	80	0.0003	—	—	—	—	—	TI
	2N911	FA	npn,DP,si	*70	1.8	200	10.3	60	—	*70	*0.0003	—	—	—	—	—	
	2N1131	FA	pnnp,DP,si	*70	2	175	13.3	*50	—	*30	*0.01	—	—	0.08	—	—	
	2N1409	PSI	npn,MS,si	70	2.8	150	0.024	30	0.5	30	10	7	1	0.06	0.1	0.8	
	2N1410	PSI	npn,MS,si	70	2.8	150	0.024	45	0.5	60	10	7	1	0.042	0.17	0.8	Power gain F=70mc RA RA, GI
	2N1889	FA	npn,DP,si	*70	3	200	17.2	60	—	*60	*0.0003	—	—	—	—	—	
	2N1974	FA	npn,DP,si	*70	3	200	17.2	60	—	*70	*0.0003	—	—	—	—	—	
	2N1987	FA	npn,DM,si	*70	2	150	0.0016	40	—	50	—	—	—	—	—	—	
	2N696	FA	npn,DP, si	*80	2	175	13.3	*60	—	*40	0.01	—	—	0.08	0.03	—	
2N717	FA	npn,DP,si	*80	1.5	175	10	*60	—	*40	0.01	—	—	0.08	—	—	GI, RA TR, SY, NA, TI, MH GI, PSI, NA, RA, MH, TI, TR	

HL continued

Cross Index Key	Type No.	Mfr.	Type	f _{ae} *f _T **f _{ab} (mc)	MAX. RATINGS			CHARACTERISTICS					SWITCHING			Remarks	
					P _c (w)	T _i (°C)	w/°C	V _{CEO} *V _{CB0} (v)	I _C (a)	h _{FE} *h _{FE}	I _{CO} (ma) (*μa)	Pow _r Gain (db)	Pow _r Out (w)	t _r (μsec)	t _s (μsec)		V _{ce(sat)} (μa)
HL 27	2N719	FA	npn, DP, si	*80	1.5	175	10	*60	—	*40	0.01	—	—	0.08	—	—	PSI, RA, GI, MH, TI, TR
	2N719A	FA	npn, DP, si	*80	1.8	200	10.3	60	—	*60	*0.0003	—	—	—	—	—	GI, TI
	2N722	FA	npn, DP, si	*80	1.5	175	10	35	—	*60	*0.01	—	—	—	—	—	TI
	2N1132	FA	npn, DP, si	*80	2	175	13.3	*50	—	*35	*0.01	—	—	—	—	—	HU, TI, TR
	2N1252	FA	npn, DP, si	*80	2	175	13.3	—	—	*35	*0.1	—	—	0.08	0.05	—	TR, IND, PSI, TI, RA
HL 28	2N1613	FA	npn, DP, si	*80	3	200	17.2	50	—	80	0.0004	17	—	0.08	—	—	RA, GI, TI, PSI
	RT482	RA	npn, DD, si	80	2	175	0.0134	20	0.5	50	0.02	—	—	—	—	—	Microbloc
	RT483	RA	npn, DD, si	80	2	175	0.0134	40	0.5	40	0.02	—	—	—	—	—	
	RT484	RA	npn, DD, si	80	2	175	0.0134	40	0.5	70	0.02	—	—	—	—	—	
	RT698M	RA	npn, DD, si	80	3	175	0.02	120	0.5	40	0.01	—	—	—	—	—	
HL 29	RT5151	RA	npn, DD, si	80	2	175	0.013	45	0.5	60	—	—	—	—	—	—	
	RT5152	RA	npn, DD, si	80	2	175	0.013	45	0.5	60	—	—	—	—	—	—	
	RT5203	RA	npn, DD, si	80	2	175	0.013	40	0.5	—	—	—	—	—	—	—	
	RT5204	RA	npn, DD, si	80	2	175	0.013	30	0.5	70	—	—	—	—	—	—	
	RT5212	RA	npn, DD, si	80	2	175	0.013	60	0.5	70	—	—	—	—	—	—	
HL 30	2N699	FA	npn, DP, si	*100	2	175	13.3	80	—	65	0.01	—	—	0.08	—	—	NA, TR, PSI, RA, US
	2N718	FA	npn, DP, si	*100	1.5	175	10	40	—	75	0.01	—	—	0.08	—	—	NA, GI, PSI, RA, TI, TR
	2N718A	FA	npn, DP, si	*100	1.8	200	0.01	50	—	80	*0.0004	—	—	—	—	—	TI, RA
	2N720	FA	npn, DP, si	*100	1.5	175	10	80	—	65	0.01	—	—	0.08	—	—	PSI, RA, NA, GI, TI, TR
	2N720A	FA	npn, DP, si	*100	1.8	200	0.01	100	—	80	*0.0004	—	—	—	—	—	GI, RA
HL 31	2N730	TI	npn, MS, si	100	1.5	175	0.01	60	—	30	0.01	—	—	0.11	0.14	0.9	FA
	2N731	TI	npn, MS, si	100	1.5	175	0.01	60	—	60	0.01	—	—	0.11	0.14	0.9	FA
	2N871	FA	npn, DP, si	*100	1.8	200	0.01	80	—	130	0.0004	—	—	—	—	—	TI
	2N909	FA	npn, DM, si	*100	1.5	175	0.01	30	—	150	*0.01	—	—	—	—	—	RA
	2N910	FA	npn, DP, si	*100	1.8	200	0.01	80	—	100	0.005	—	—	—	—	—	Microbloc, RA
HL 32	2N1060	WE	npn, MS, si	100	—	150	2	40	0.05	40	*0.001	—	—	—	—	—	Microbloc, RA
	2N1253	FA	npn, DP, si	*100	2	175	13.3	20	—	45	0.01	—	—	0.08	0.05	—	Microbloc, RA
	2N1420	FA	npn, DP, si	100	2w	175	13.3	30	0.25	130	0.1	—	20	—	—	—	Microbloc, RA
	2N1444	WE	npn, DM, si	100	—	150	4	60	—	25	*0.002	—	—	—	—	—	Microbloc, RA
	2N1711	FA	npn, DP, si	*100	3	200	0.017	50	—	130	*0.0004	—	—	—	—	—	CL, Epitaxial, RA
HL 33	2N1890	FA	npn, DP, si	*100	3	200	0.017	80	—	130	*0.0004	—	—	—	—	—	Epitaxial
	2N1972	FA	npn, DM, si	*100	2	175	0.013	30	—	150	*0.01	—	—	—	—	—	Epitaxial
	2N1973	FA	npn, DP, si	*100	3	200	0.017	80	—	100	*0.005	—	—	—	—	—	Epitaxial
	2N1983	FA	npn, DM, si	*100	2	150	0.0016	35	—	140	—	—	—	—	—	—	Epitaxial
	2N2315	RA	npn, DD, si	100	3	175	0.02	60	0.5	70	0.003	—	—	—	—	—	Epitaxial
HL 34	2N2316	RA	npn, DD, si	100	3	175	0.02	120	0.5	65	0.01	—	—	—	—	—	Epitaxial
	2N2317	RA	npn, DD, si	100	3	175	0.02	75	0.5	45	0.001	—	—	—	—	—	Epitaxial
	2N2317	FA	npn, DP, si	*150	1.2	200	0.007	25	—	45	*0.0008	—	—	—	—	—	Epitaxial
	2N915	FA	npn, DP, si	*400	1.2	200	0.007	60	—	70	0.003	—	—	—	—	—	Epitaxial
	2N916	FA	npn, DP, si	*400	1.2	200	6.9	25	—	80*	0.002*	—	—	—	—	—	Epitaxial
HL 35	2N947	FA	npn, DP, si	*400	1.2	200	0.0069	—	—	*50	*0.005	—	—	—	—	—	Epitaxial
	2N2217	MO	npn, DDPL, si	400	3	175	5.33	*60	—	20-60	0.01	—	—	—	—	—	Epitaxial
	2N2218	MO	npn, DDPL, si	400	3	175	5.33mw	*60	—	40-120	0.01	—	—	—	—	—	Epitaxial
	2N2219	MO	npn, DDPL, si	400	3	175	5.33mw	*60	—	100	0.01	—	—	—	—	—	Epitaxial
	2N2220	MO	npn, DDPL, si	400	1.8	175	3.33mw	*60	—	20-60	0.01	—	—	—	—	—	Epitaxial
HL 36	2N2221	MO	npn, DDPL, si	400	1.8	175	3.33mw	*60	—	40-120	0.01	—	—	—	—	—	Epitaxial
	2N2222	MO	npn, DDPL, si	400	1.8	175	3.33mw	*60	—	100-300	0.01	—	—	—	—	—	Epitaxial
	2N2767	GI	npn, PE, si	*400	3	175	5.33	35	—	*20-60	2na	—	—	—	—	—	Epitaxial
	2N2768	GI	npn, PE, si	*400	3	175	5.33	35	—	*40-120	2na	—	—	—	—	—	Epitaxial
	2N2769	GI	npn, PE, si	*400	3	175	5.33	35	—	*100-300	2na	—	—	—	—	—	Epitaxial
HL 37	2N2790	GI	npn, PE, si	*400	1.8	175	3.33	35	—	*20-60	2na	—	—	—	—	—	GI, CL, MO
	2N2791	GI	npn, PE, si	*400	1.8	175	3.33	35	—	*40-120	2na	—	—	—	—	—	CL, Epitaxial, MO
	2N2792	GI	npn, PE, si	*400	1.8	175	3.33	35	—	*100-300	2na	—	—	—	—	—	
	2N708	FA	npn, DP, si	*450	1.2	200	6.9	15	—	*50	*0.004	—	—	—	—	—	
	2N914	FA	npn, DP, si	*450	1.2	200	0.007	20	—	50	0.0004	—	—	—	—	—	
HL 38	2N2368	FA	npn, DP, si	*650	1.2	200	0.0069	15	—	*40	*0.1	—	—	—	—	—	
	2N2369	FA	npn, DP, si	*650	1.2	200	0.0069	15	—	*70	*0.1	—	—	—	—	—	
	2N1645	WE	npn, D, ge	700	6.0	100	80.0	35	0.3	20	0.015	—	—	—	—	—	
	2N709	FA	npn, DP, si	*800	1.0	200	0.005	6.0	—	*55	*0.005	—	—	—	—	—	
	2N917	FA	npn, DP, si	*800	0.3	200	0.00171	15	—	*50	*0.0003	—	—	—	—	—	
HL 39	2N918	FA	npn, DP, si	*900	0.3	200	0.00171	15	—	*50	*0.0003	—	—	—	—	—	MO
	2N268A	CL	npn, AJ, ge	—	14	90	1.5	80	3	—	2	—	—	—	—	—	BE, 2N639A
	2N497A	GE	npn, MS, si	—	1	200	—	60	—	12	10	—	—	—	—	—	TI
	2N498A	GE	npn, DM, si	—	1	200	—	60	—	12	10	—	—	—	—	—	NA, TI
	2N656A	GE	npn, DM, si	—	1	200	—	60	—	30	10	—	—	—	—	—	NA, TI
HL 33	2N657A	GE	npn, DM, si	—	1	200	—	100	—	30	10	—	—	—	—	—	NA, TI
	2N720A	TI	npn, PL, si	—	1.8	—	—	120	—	*40-120	—	—	—	—	—	—	
	2N1751	BE	npn, DAP, ge	—	—	110	1250	80	25	50	5	—	—	—	—	—	
	2N1813	WH	npn, F, J, si	—	—	175	2.22	*250	30	10	15	—	—	—	—	—	
	2N1814	WH	npn, F, J, si	—	250	175	2.22	*300	30	10	15	—	—	—	—	—	

HL *continued*

Cross Index Key	Type No.	Mfr.	Type	f_{ae} * f_T ** f_{ab} (mc)	MAX. RATINGS			CHARACTERISTICS					SWITCHING				Remarks
					P_c (w)	T_j (°C)	$w/°C$	V_{CEO} * V_{CBO} (v)	I_C (a)	h_{FE} * h_{FE}	I_{CO} (ma) (* μa)	P_{owr} Gain (db)	$P_{owr.}$ Out (w)	t_r (μsec)	t_s (μsec)	$V_{ce(sat)}$ (μa)	
HL 34	2N1837	GE	npn, P, si	—	2	175	13.3	*80	—	*120	—	—	—	—	—	0.8	GI RA
	2N1837A	GE	npn, P, si	—	2.8	175	18.6	*80	—	*120	—	—	—	—	—	0.8	
	2N1841	WE	non, D, si	—	100	150	100	60	2.0	—	0.0001	—	—	—	—	—	
	2N1990	FA	non, DM, si	—	2	150	0.0016	—	40	25	—	—	—	—	—	—	
	2N2243	GE	npn, PE, si	—	2.8	200	16.0	80	—	2.5	—	—	—	—	—	0.35	
	2N2243A	GE	npn, PE, si	—	2.8	200	16.0	80	—	2.5	—	—	—	—	—	0.16	
HL 35	2N2285	BE	pnp, DAP, ge	—	—	110	1250	60	25	50	5	7	4	—	—	—	
	2N2286	BE	pnp, DAP, ge	—	—	110	1250	100	25	30	5	7	4	—	—	—	
	2N2287	BE	pnp, DAP, ge	—	—	110	1250	120	25	50	5	7	4	—	—	—	
	2N2288	BE	pnp, DAP, ge	—	—	110	1250	40	10	50	5	7	4	—	—	—	
	2N2289	BE	pnp, DAP, ge	—	—	110	1250	80	10	50	5	7	4	—	—	—	
	2N2290	BE	pnp, DAP, ge	—	—	110	1250	40	10	75	5	7	4	—	—	—	
HL 36	2N2291	BE	pnp, DAP, ge	—	—	110	1250	80	10	75	5	7	4	—	—	—	TO-51 coplanar ft = 600 mc
	2N2292	BE	pnp, DAP, ge	—	—	110	1250	120	10	75	5	7	4	—	—	—	
	2N2293	BE	pnp, DAP, ge	—	—	110	1250	120	10	75	5	7	4	—	—	—	
	2N2294	BE	pnp, DAP, ge	—	—	110	1250	40	10	75	5	7	4	—	—	—	
	2N2295	BE	pnp, DAP, ge	—	—	110	1250	80	10	75	5	7	4	—	—	—	
	2N2296	BE	pnp, DAP, ge	—	—	110	1250	120	10	75	5	7	4	—	—	—	
HL 37	2N2357	BE	pnp, DAP, ge	—	—	110	2000	170	50	50	5	7	4	—	—	—	ft = 1000 mc
	2N2358	BE	pnp, DAP, ge	—	—	110	2000	170	50	50	5	7	4	—	—	—	
	2N2359	BE	pnp, DAP, ge	—	—	110	2000	170	50	50	5	7	4	—	—	—	
	2N2389	TI	npn, PL, si	—	2.0	—	—	35	0.6	*0.0*120	—	—	—	—	—	1.5	
	2N2390	TI	npn, PL, si	—	2.0	—	—	35	0.6	*100*300	—	—	—	—	—	1.5	
	2N2393	TI	pnp, PL, si	—	1.2	—	—	35	0.3	*20*45	—	—	—	—	—	1.5	
HL 38	2N2394	TI	pnp, PL, si	—	2.0	—	—	35	0.3	*30*90	—	—	—	—	—	—	7/16 Hex TO-5 Pancake
	2N2395	TI	npn, PL, si	—	2.0	—	—	40	0.3	*20*60	—	—	—	—	—	1.0	
	2N2396	TI	npn, PL, si	—	2.0	—	—	40	0.3	*40*120	—	—	—	—	—	1.0	
	2N2397	SY	npn, EP, si	—	300	200	1.7	35	200	25	0.10	2.5	25	20	0.3	—	
	2N2410	TI	npn, PE, si	—	2.5	—	—	30	0.8	*30*120	—	—	—	—	—	0.45	
	2N2455	SY	pnp, EP, ge	—	150	100	2.0	15	200	40	2.0	3.5	30	60	0.19	—	
HL 39	2N2456	SY	pnp, EP, ge	—	150	100	2.0	15	200	40	2.0	3.0	15	65	0.19	—	Pancake TO-5 TO-5
	PA0T50	AMP	pnp, PADT, ge	—	16.5	75	—	75	0.75	—	—	—	—	—	—	—	
	RT5401	RA	non, si	—	0.7	200	—	30	—	6.0	0.1	—	—	—	—	2.5	
	RT5402	RA	non, si	—	0.7	200	—	30	—	6.0	0.1	—	—	—	—	2.0	
	RT5403	RA	npn, si	—	0.7	200	—	60	—	5.5	0.1	—	—	—	—	3.0	
	RT5404	RA	npn, si	—	0.7	200	—	60	—	5.5	0.1	—	—	—	—	2.0	
HL 40	ST8014	TR	pnp, DM, si	—	—	175	—	20	—	85	0.001	—	—	—	—	1.5	7/16 Hex TO-5 Pancake
	TN51	SSP	npn, PE, si	—	5	200	—	60	5	45	0.00002	—	—	—	—	0.3	
	TN52	SSP	npn, PE, si	—	5	200	—	60	5	80	0.00002	—	—	—	—	0.3	
	TN61	SSP	npn, PE, si	—	5	200	0.004	60	5	45	0.00002	—	—	—	—	0.3	
	TN62	SSP	npn, PE, si	—	5	200	0.004	60	5	80	0.00002	—	—	—	—	0.3	
	TN71	SSP	npn, PE, si	—	5	200	0.005	60	5	45	0.00002	—	—	—	—	0.3	
HL 41	TN72	SSP	npn, PE, si	—	5	200	0.005	60	5	80	0.00002	—	—	—	—	0.3	
	TN73	SSP	npn, PE, si	—	5	200	0.005	60	5	80	0.00002	—	—	—	—	0.3	

FIELD EFFECT

In order of transconductance.

Cross Index Key	Type No.	Mfr.	Channel & Construction	g_m ($\mu mhos$)	V_p (v)	I_{DSS} (ma)	C_{is} or C_{DG}	BV_{DGO} or BV_{DGS} (v)	NF (db)
FE 1	18A1	GE	p,GD,si	30 min	1	0.05	5	-10	1.5
	C620	CT	n,A,si	75	10	0.1	35	10	
	C622	CT	n,A,si	75	10	0.1	35	10	
	C624	CT	n,A,si	75	10	0.1	35	10	
	2N2841	SI	p,DP,si	90	0.8	-50	4	*20	
	18A2	GE	p,GD,si	100 min	1	0.25	5	-10	
	C621	CT	n,A,si	100	10	0.35	35	10	
	C623	CT	n,A,si	100	10	0.35	35	10	
	C625	CT	n,A,si	100	10	0.35	35	10	
	2N2606	SI	p,DP,si	175	2	-0.17	4	*30	
FE 2	C632	CT	n,A,si	175	250	1.0	23	250	1.5
	C633	CT	n,A,si	175	350	1.0	23	350	
	C631	CT	n,A,si	200	150	1.0	23	150	
	U-110	SI	p,DP,si	200	3	-0.31	4	*20	
	C610	CT	n,A,si	250	40	0.6	35	40	
	C614	CT	n,A,si	250	40	0.6	35	40	
	2N2842	SI	p,DP,si	270	0.8	-150	7	*20	
	C611	CT	n,A,si	400	40	3.0	35	40	
	18A3	GE	p,GD,si	500 min	1	0.75	5	-10	
	XF600	SIG	pn,DP,si	500	2-3	0.5	—	30	
FE 3	2N2607	SI	p,DP,si	525	2	-0.52	7	*30	1.5
	FE200	AI	n,DP,si	600	10	1.0	*1.5	50	
	C612	CT	n,A,si	650	40	3.0	35	40	
	C615	CT	n,A,si	750	40	1.5	35	40	
	2N2843	SI	p,DP,si	800	0.8	-450	12	*20	
	2N2386	TI, TS	p,DP,si	1000 min	8	—	50	20	
	2N2497	TI	p,DP,si	1000 min	5	-3 max	32	20	
	2N2500	TI	p,DP,si	1000 min	6	-6 max	32	20	
	2N2794	TS	p,DP,si	1000 min	—	0.01	6	20	
	18A4	GE	p,GD,si	1000 min	2	2.0	5	-10	
FE 4	C613	CT	n,A,si	1000	40	3.0	35	40	1.5
	FG34	AI	n,DP,si	1000	20	10	—	50	
	FG35	AI	n,DP,si	1000	20	—	—	100	
	FG36	AI	n,DP,si	1000	20	—	—	150	
	FG37	AI	n,DP,si	1000	20	—	—	200	
	XF601	SIG	pn,DP,si	1000	2-3	1.0	—	30	
	FE300	AI	n,DP,si	1250	10	3.0	*1.5	50	
	2N2498	TI	p,DP,si	1500 min	6	-6 max	32	20	
	18A5	GE	p,GD,si	1500 min	2	5.0	5	-10	
	2N2608	SI	p,DP,si	1600	2	-1.60	12	*30	
FE 5	U-112	SI	p,DP,si	1900	3	-3.0	12	*20	1.5
	2N2844	SI	p,DP,si	2000	0.8	-1000	25	*20	
	18A6	GE	p,GD,si	2000 min	2	12.0	5	-10	
	C640	CT	n,A,si	2000	35	4.0	35	35	
	2N2499	TI	p,DP,si	2500 min	8	-15 max	32	20	
	MM763	MO	n,P,si	3000	2	2	50	25	
	MM764	MO	n,P,si	3200	3	4	50	25	
	MM765	MO	n,P,si	3500	6.5	10	50	25	
	2N2609	SI	p,DP,si	3600	2	-3.60	25	*30	
	C641	CT	n,A,si	4000	35	8.0	35	35	
FE 6	C642	CT	n,A,si	6000	35	12.0	35	35	—
	C643	CT	n,A,si	9000	35	18.0	35	35	
	C644	CT	n,A,si	12000	35	24.0	35	35	
	C650	CT	n,A,si	—	45	—	—	45	
	C651	CT	n,A,si	—	35	—	—	35	
	C652	CT	n,A,si	—	25	—	—	25	
	C653	CT	n,A,si	—	15	—	—	15	

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UNJ 1	2N489A	GE	n, si	6.8	.62	12	15	4	60	3	3	TI
	2N498B	GE	n, si	6.8	.62	120	20	4	60	3	3	TI
	2N490A	GE	n, si	9.1	.62	120	15	4	60	3	3	TI
	2N490B	GE	n, si	9.1	.62	0.02	6	4	60	3	3	TI
UNJ 2	2N491B	GE	n, si	6.8	.68	12	15	4.3	60	3	3	TI
	2N491A	GE	n, si	6.8	.68	12	15	4.3	60	3	3	TI
	2N491	GE	n, si	6.8	.68	12	15	4.3	60	3	3	TI
	2N490C	GE	n, si	9.1	.62	0.02	6	4	60	3	3	TI
UNJ 3	2N494C	GE	n, si	9.1	.75	2	2	4.6	60	3	3	3
	2N494B	GE	n, si	9.1	.75	12	15	4.6	60	3	3	3
	2N494A	GE	n, si	9.1	.75	12	15	4.6	60	3	3	3
	2N493A	GE	n, si	6.8	.75	12	15	4.6	60	3	3	3
UNJ 4	2N2418B	GE	n, si	9.1	.68	0.20	6	5	60	3	3	3
	2N2419A	GE	n, si	6.8	.68	12	15	4.3	60	3	3	3
	2N2419B	GE	n, si	6.8	.68	0.20	6	4.3	60	3	3	3
	2N2420	GE	n, si	9.1	.68	12	25	5	60	3	3	3
UNJ 5	2N2420A	GE	n, si	9.1	.68	12	15	4.3	60	3	3	3
	2N2420B	GE	n, si	9.1	.68	0.20	6	4.3	60	3	3	3
	2N2421	GE	n, si	6.8	.75	12	25	5	60	3	3	3
	2N2421A	GE	n, si	6.8	.75	12	15	4.6	60	3	3	3
UNJ 6	2N2422	GE	n, si	9.1	.75	12	25	5	60	3	3	3
	2N2422B	GE	n, si	9.1	.75	12	25	5	60	3	3	3
	2N1671	TI	pn, GJ, si	4.7-9.1	.47-.62	-12	25	5.0	60	3	3	3
	2N2160	TI	pn, GJ, si	4.0-12.0	.47-.62	-12	25	5.0	60	3	3	3

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2N2580	400	325v	10 min. 40 max.		0.7v		1.5v	
2N2581	400	325v	25 min. 65 max.	10 min.		1.0v		1.7v
2N2582	500	325v	10 min. 40 max.		0.7v		1.5v	
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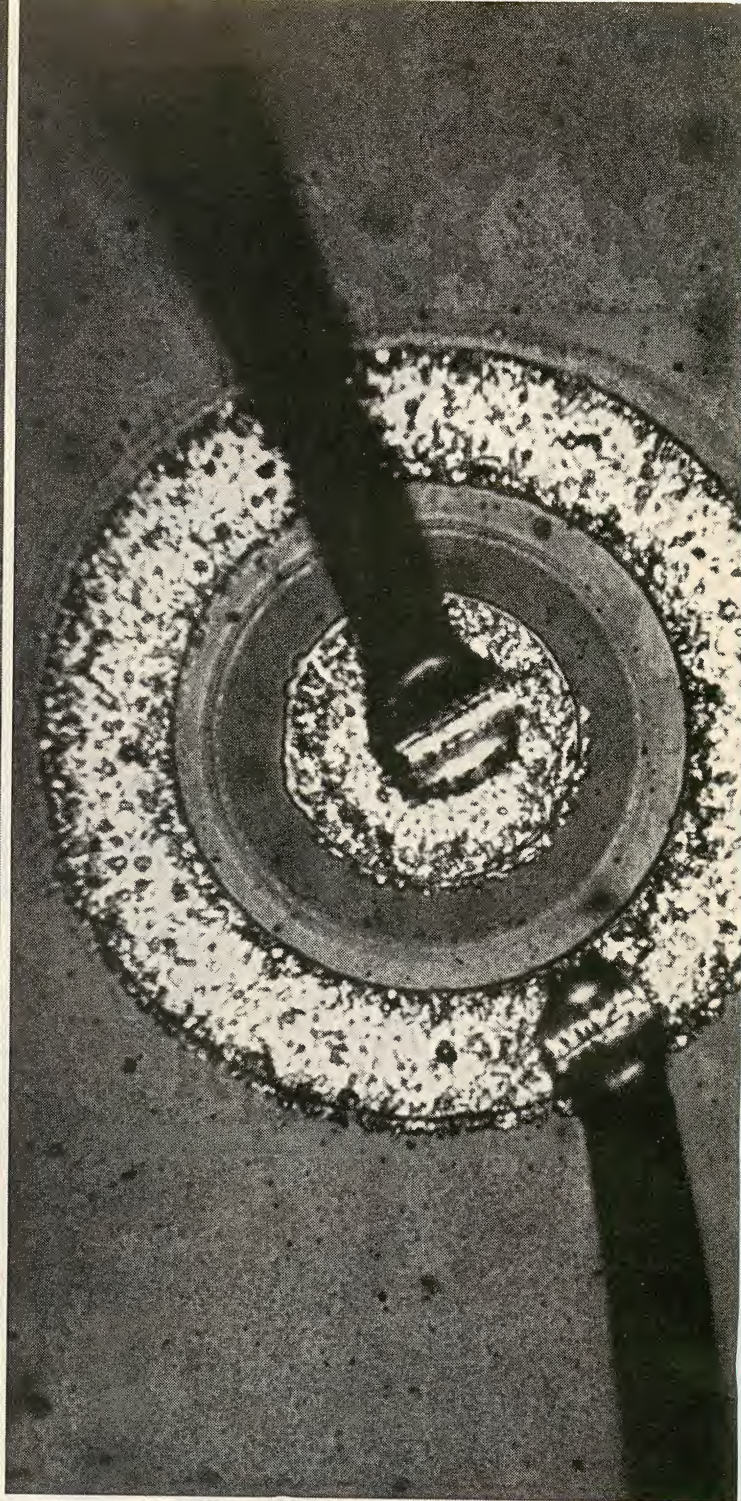
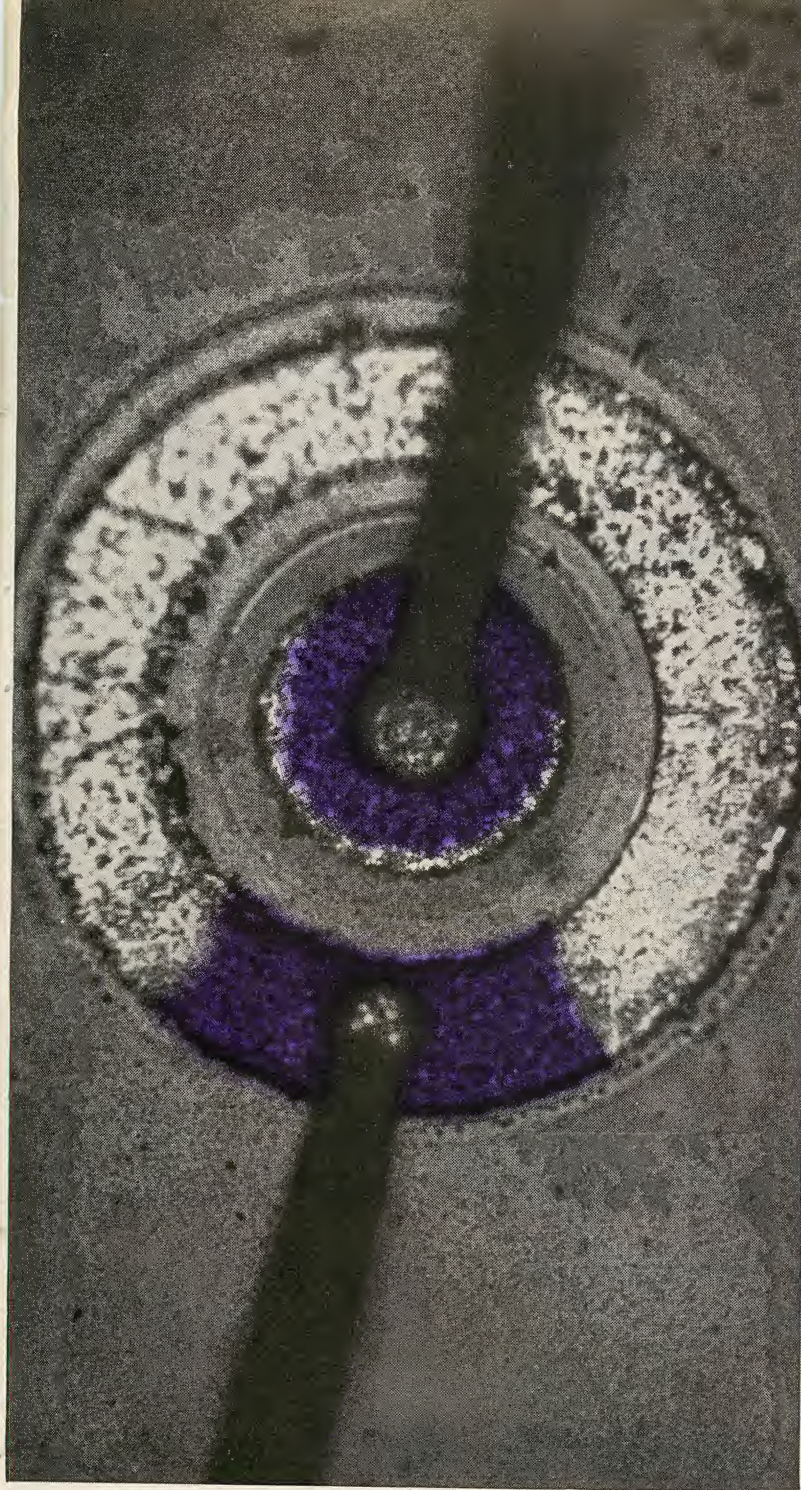
HOW TO USE THE CROSS INDEX

Types are listed in numerical sequence. EIA-registered types come first, followed by house-numbered types. The code following each type identifies its application category and the block of 10 types in which it is located. A3, for example, means the type can be found in the third block of the Audio section. Key to the letter codes is: A = audio and general purpose, P = power, HF = high frequency, LL = low-level switching, HL = high-level switching, FE = field effect, UNJ = unijunction.

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2N207B	A38	2N332A	A3	2N405	LL46	2N496	HF15	2N556	A15	2N636	HF18	2N707G	HF52
2N211	HF3	2N333	A7	2N406	LL46	2N497	HF15	2N557	A15	2N637	HF18	2N707H	HF52
2N212	HF3	2N333A	A3	2N407	LL46	2N498	HF15	2N558	A15	2N638	HF18	2N707I	HF52
2N213	A31	2N334	A8	2N408	LL46	2N499	HF15	2N559	A15	2N639	HF18	2N707J	HF52
2N213A	A46	2N334A	A7	2N409	LL46	2N500	HF15	2N560	A15	2N640	HF18	2N707K	HF52
2N214	A25	2N335	A17	2N410	LL46	2N501	HF15	2N561	A15	2N641	HF18	2N707L	HF52
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2N219	HF11	2N337A	LL32	2N414	LL46	2N505	HF15	2N565	A15	2N645	HF18	2N707P	HF52
2N220	A28	2N338	LL31	2N415	LL46	2N506	HF15	2N566	A15	2N646	HF18	2N707Q	HF52
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2N232	HF15	2N342	A5	2N419	LL46	2N510	HF15	2N570	A15	2N650	HF18	2N707U	HF52
2N233	HF55	2N343	P2	2N420	LL46	2N511	HF15	2N571	A15	2N651	HF18	2N707V	HF52
2N233A	HF55	2N344	P2	2N421	LL46	2N512	HF15	2N572	A15	2N652	HF18	2N707W	HF52
2N234	HF55	2N345	P2	2N422	LL46	2N513	HF15	2N573	A15	2N653	HF18	2N707X	HF52
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2N236A	P31	2N348	P2	2N425	LL46	2N516	HF15	2N576	A15	2N656	HF18	2N708	HF52
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2N739A	HF33	2N718	A23, HF63,	2N1047A	P37	2N1184A	P17	2N1358H	P53	2N1531	P54	2N1671B	UNJ5
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2N747	LL31	2N730A	HF34	2N1051	A8, LL8	2N1200	HF69, LL43	2N1379	A45	2N1541	P56	2N1704	P41
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2N755	HF21	2N736	A5	2N1057	HL22	2N1206	HL22	2N1385	LL45	2N1545	P57	2N1711	P19
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2N756A	A4, 6	2N738	A13	2N1059	A25	2N1208	HL22	2N1387	LL45	2N1547	P57	2N1713	P19
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2N759	HF33	2N743	A46	2N1064	P19	2N1213	LL50	2N1392	LL45	2N1552	P57	2N1718	P20
2N759A	A17, HF23	2N744	A46	2N1065	P40	2N1214	LL50	2N1393	LL45	2N1553	P57	2N1719	P20
2N759B	A17, 29	2N745	A46	2N1066	P40	2N1215	LL50	2N1394	LL45	2N1554	P57	2N1720	P20
2N759B	HF33	2N746	A46	2N1067	P40	2N1216	LL51	2N1395	LL45	2N1555	P57	2N1721	P20
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2N760B	HF33	2N749	HF23	2N1070	P42, 52, HL4	2N1219	LL13	2N1398	LL45	2N1558	P57	2N1724	P20
2N761	A9	2N750	HF23	2N1071	P42, 52, HL4	2N1220	LL6	2N1399	LL45	2N1559	P57	2N1725	P20
2N762	A22	2N751	HF23	2N1072	P42, 52, HL4	2N1221	LL6	2N1400	LL45	2N1560	P57	2N1726	P20
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2N770	LL44	2N754	HF50, 60	2N1075	P42, 52, HL4	2N1224	LL7	2N1403	LL45	2N1563	P57	2N1729	P20
2N770B	LL44	2N755	HF50, 60	2N1076	P42, 52, HL4	2N1225	LL7	2N1404	LL45	2N1564	P57	2N1730	P20
2N780	A34	2N756	HF50, 60	2N1077	P42, 52, HL4	2N1226	LL7	2N1405	LL45	2N1565	P57	2N1731	P20
2N781	HF67, LL49	2N757	HF50, 60	2N1078	P42, 52, HL4	2N1227	LL7	2N1406	LL45	2N1566	P57	2N1732	P20
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2N784	HF67	2N760	HF50, 60	2N1081	P42, 52, HL4	2N1230	LL7	2N1409	LL45	2N1569	P57	2N1735	P20
2N784A	HF54, LL4	2N761	HF50, 60	2N1082	P42, 52, HL4	2N1231	LL7	2N1410	LL45	2N1570	P57	2N1736	P20
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2N794	LL9	2N769	HF50, 60	2N1090	P42, 52, HL4	2N1239	LL7	2N1418	LL45	2N1578	P57	2N1744	P20
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2N802	LL8	2N775	HF50, 60	2N1096	P42, 52, HL4	2N1245	LL7	2N1424	LL45	2N1584	P57	2N1750	P20
2N803	LL8	2N776	HF50, 60	2N1097	P42, 52, HL4	2N1246	LL7	2N1425	LL45	2N1585	P57	2N1751	P20
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2N808	LL8	2N781	HF50, 60	2N1102	P42, 52, HL4	2N1251	LL7	2N1430	LL45	2N1590	P57	2N1756	P20
2N809	LL8	2N782	HF50, 60	2N1103	P42, 52, HL4	2N1252	LL7	2N1431	LL45	2N1591	P57	2N1757	P20
2N810	LL8	2N783	HF50, 60	2N1104	P42, 52, HL4	2N1253	LL7	2N1432	LL45	2N1592	P57	2N1758	P20
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2N812	LL8	2N785	HF50, 60	2N1106	P42, 52, HL4	2N1255	LL7	2N1434	LL45	2N1594	P57	2N1760	P20
2N813	LL8	2N786	HF50, 60	2N1107	P42, 52, HL4	2N1256	LL7	2N1435	LL45	2N1595	P57	2N1761	P20
2N814	LL8	2N787	HF50, 60	2N1108	P42, 52, HL4	2N1257	LL7	2N1436	LL45	2N1596	P57	2N1762	P20
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2N825	LL8	2N798	HF50, 60	2N1119	P42, 52, HL4	2N1268	LL7	2N1447	LL45	2N1607	P57	2N1773	P20
2N826	LL8	2N799	HF50, 60	2N1120	P42, 52, HL4	2N1269	LL7	2N1448	LL45	2			

20182	20183	20184	20185	20186	20187	20188	20189	20190	20191	20192	20193	20194	20195	20196	20197	20198	20199	20200	20201	20202	20203	20204	20205	20206	20207	20208	20209	20210	20211	20212	20213	20214	20215	20216	20217	20218	20219	20220	20221	20222	20223	20224	20225	20226	20227	20228	20229	20230	20231	20232	20233	20234	20235	20236	20237	20238	20239	20240	20241	20242	20243	20244	20245	20246	20247	20248	20249	20250	20251	20252	20253	20254	20255	20256	20257	20258	20259	20260	20261	20262	20263	20264	20265	20266	20267	20268	20269	20270	20271	20272	20273	20274	20275	20276	20277	20278	20279	20280	20281	20282	20283	20284	20285	20286	20287	20288	20289	20290	20291	20292	20293	20294	20295	20296	20297	20298	20299	20300	20301	20302	20303	20304	20305	20306	20307	20308	20309	20310	20311	20312	20313	20314	20315	20316	20317	20318	20319	20320	20321	20322	20323	20324	20325	20326	20327	20328	20329	20330	20331	20332	20333	20334	20335	20336	20337	20338	20339	20340	20341	20342	20343	20344	20345	20346	20347	20348	20349	20350	20351	20352	20353	20354	20355	20356	20357	20358	20359	20360	20361	20362	20363	20364	20365	20366	20367	20368	20369	20370	20371	20372	20373	20374	20375	20376	20377	20378	20379	20380	20381	20382	20383	20384	20385	20386	20387	20388	20389	20390	20391	20392	20393	20394	20395	20396	20397	20398	20399	20400	20401	20402	20403	20404	20405	20406	20407	20408	20409	20410	20411	20412	20413	20414	20415	20416	20417	20418	20419	20420	20421	20422	20423	20424	20425	20426	20427	20428	20429	20430	20431	20432	20433	20434	20435	20436	20437	20438	20439	20440	20441	20442	20443	20444	20445	20446	20447	20448	20449	20450	20451	20452	20453	20454	20455	20456	20457	20458	20459	20460	20461	20462	20463	20464	20465	20466	20467	20468	20469	20470	20471	20472	20473	20474	20475	20476	20477	20478	20479	20480	20481	20482	20483	20484	20485	20486	20487	20488	20489	20490	20491	20492	20493	20494	20495	20496	20497	20498	20499	20500	20501	20502	20503	20504	20505	20506	20507	20508	20509	20510	20511	20512	20513	20514	20515	20516	20517	20518	20519	20520	20521	20522	20523	20524	20525	20526	20527	20528	20529	20530	20531	20532	20533	20534	20535	20536	20537	20538	20539	20540	20541	20542	20543	20544	20545	20546	20547	20548	20549	20550	20551	20552	20553	20554	20555	20556	20557	20558	20559	20560	20561	20562	20563	20564	20565	20566	20567	20568	20569	20570	20571	20572	20573	20574	20575	20576	20577	20578	20579	20580	20581	20582	20583	20584	20585	20586	20587	20588	20589	20590	20591	20592	20593	20594	20595	20596	20597	20598	20599	20600	20601	20602	20603	20604	20605	20606	20607	20608	20609	20610	20611	20612	20613	20614	20615	20616	20617	20618	20619	20620	20621	20622	20623	20624	20625	20626	20627	20628	20629	20630	20631	20632	20633	20634	20635	20636	20637	20638	20639	20640	20641	20642	20643	20644	20645	20646	20647	20648	20649	20650	20651	20652	20653	20654	20655	20656	20657	20658	20659	20660	20661	20662	20663	20664	20665	20666	20667	20668	20669	20670	20671	20672	20673	20674	20675	20676	20677	20678	20679	20680	20681	20682	20683	20684	20685	20686	20687	20688	20689	20690	20691	20692	20693	20694	20695	20696	20697	20698	20699	20700	20701	20702	20703	20704	20705	20706	20707	20708	20709	20710	20711	20712	20713	20714	20715	20716	20717	20718	20719	20720	20721	20722	20723	20724	20725	20726	20727	20728	20729	20730	20731	20732	20733	20734	20735	20736	20737	20738	20739	20740	20741	20742	20743	20744	20745	20746	20747	20748	20749	20750	20751	20752	20753	20754	20755	20756	20757	20758	20759	20760	20761	20762	20763	20764	20765	20766	20767	20768	20769	20770	20771	20772	20773	20774	20775	20776	20777	20778	20779	20780	20781	20782	20783	20784	20785	20786	20787	20788	20789	20790	20791	20792	20793	20794	20795	20796	20797	20798	20799	20800	20801	20802	20803	20804	20805	20806	20807	20808	20809	20810	20811	20812	20813	20814	20815	20816	20817	20818	20819	20820	20821	20822	20823	20824	20825	20826	20827	20828	20829	20830	20831	20832	20833	20834	20835	20836	20837	20838	20839	20840	20841	20842	20843	20844	20845	20846	20847	20848	20849	20850	20851	20852	20853	20854	20855	20856	20857	20858	20859	20860	20861	20862	20863	20864	20865	20866	20867	20868	20869	20870	20871	20872	20873	20874	20875	20876	20877	20878	20879	20880	20881	20882	20883	20884	20885	20886	20887	20888	20889	20890	20891	20892	20893	20894	20895	20896	20897	20898	20899	20900	20901	20902	20903	20904	20905	20906	20907	20908	20909	20910	20911	20912	20913	20914	20915	20916	20917	20918	20919	20920	20921	20922	20923	20924	20925	20926	20927	20928	20929	20930	20931	20932	20933	20934	20935	20936	20937	20938	20939	20940	20941	20942	20943	20944	20945	20946	20947	20948	20949	20950	20951	20952	20953	20954	20955	20956	20957	20958	20959	20960	20961	20962	20963	20964	20965	20966	20967	20968	20969	20970	20971	20972	20973	20974	20975	20976	20977	20978	20979	20980	20981	20982	20983	20984	20985	20986	20987	20988	20989	20990	20991	20992	20993	20994	20995	20996	20997	20998	20999	21000	21001	21002	21003	21004	21005	21006	21007	21008	21009	21010	21011	21012	21013	21014	21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How Sylvania checked "purple plague" and boosted reliability

What you see above represents a victory over an insidious cause of semiconductor device failure—a problem faced by the whole industry—the "purple plague."

On the left, the blotches are a gold-aluminum-silicon alloy formed by reaction between the gold wires and aluminum base areas of the chip. Accelerated by high temperatures, this reaction increases se-

ries resistance and weakens the leads—bad news when reliability is essential.

Sylvania engineers departed from standard industry practice and developed a technique of bonding aluminum wires to aluminum, illustrated at the right. After long testing at worse-than-actual conditions, the clean Sylvania junctions confirm: no chemical reaction, no purple plague at

the chip—a big step forward that means greater system reliability.

All Sylvania epitaxial planar devices now benefit from this victory. The broad, integrated capabilities that made it possible are being applied constantly to the improvement of Sylvania semiconductors.

Semiconductor Division, Sylvania Electric Products Inc., Woburn, Massachusetts.

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NEW CAPABILITIES IN: ELECTRONIC TUBES • SEMICONDUCTORS • MICROWAVE DEVICES • SPECIAL COMPONENTS • DISPLAY DEVICES



PD-135

NEW PHELPS DODGE ELECTRONIC ALLOY

PD-135 is Phelps Dodge's new copper base alloy with high conductivity, excellent ductility, and retention of high strength at elevated temperatures. Developed with an oxygen free copper base, PD-135 is controlled by Phelps Dodge throughout every step of casting, and fabrication into rod, bar, wire, and strip forms.

Heat-treatable PD-135 is particularly suited for applications requiring extensive cold working and upsetting.

PD-135 is completely free-flowing, and cold forms to truest tolerances. A heat-treatable alloy, PD-135 does not lose its high strength characteristics after exposure to high temperatures.

PD-135 is sold in minimum mill quantities of 500 lbs. per size. For complete information, including performance data, on this noteworthy new alloy, send for Brochure K. Just write Phelps Dodge at the address below.

PHELPS DODGE

ON READER-SERVICE CARD CIRCLE 475

COPPER PRODUCTS CORPORATION
300 Park Avenue, New York 22, N.Y.

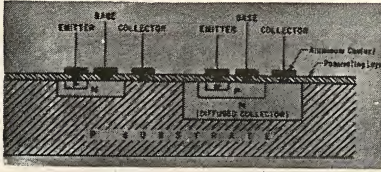


ELECTRONIC DESIGN

Transistors and allied products have been included for your convenience in the Transistor Data Chart section of the magazine. The Reader-Service numbers for the products can be circled on either the Reader-Service card in the main section or the special one in the back of this Data Chart.

Paired Transistors

Experimental products



Saturation voltage for model XT999, a monolithic NPN and PNP pair, is 0.3 v for $I_c = 10$ ma and $I_b = 1$ ma. An FET pair, model X-600, provides gms of approximately 1000 μ mhos and has a pinch-off voltage of 2-3 v.

P&A: \$84-\$95; 4 weeks.

Mfr: Signetics Corp.

ON READER-SERVICE CARD CIRCLE 500

Transistors

Silicon planar

Eighty-one types are manufactured in the Leaf configuration. Collector saturation voltage is 0.2 v at $I_c = 150$ ma dc, $I_B = 15$ ma dc. Beta linearity is $h_{FE} = 65$ at $I_c = 0.5$ amp dc and 30 at 1 amp dc.

Price: \$1.05-\$25.50 (100-999).

Mfr: Bendix Corp., Semiconductor Div.

ON READER-SERVICE CARD CIRCLE 501

Silicon Transistors

Diffused mesa



High-collector voltages, low-saturation voltages, fast-switching speeds and relatively fast betas are claimed for types 2N389, 2N424, 2N1015, etc. Diffused-mesa construction is said to have improved a present line of 41 silicon power transistors.

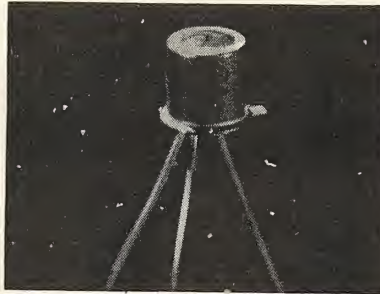
Price: \$1.05-\$25.50 (100-999).

Mfr: Bendix Corp., Semiconductor Div.

ON READER-SERVICE CARD CIRCLE 502

Photo-Transistors

High sensitivity



Sensitivity radiation system range is 50-200 μ a/mw/cm² for type 2N2452. Sensitivity illumination system range is 2.6-10.3 μ a/ft-c. Unit is designed as a companion to type 2N986.

P&A: \$27 (1-99); 4 weeks.

Mfr: Fairchild Semiconductor.

ON READER-SERVICE CARD CIRCLE 503

Power Transistors

150-w dissipation

A tight two-to-one h_{FE} ratio (50-100 at 3 amps) makes types 2N1539 through 2N1543 useful for power amplifier applications with critical stability requirements. The 150-w dissipation rating is said to be the highest available in the TO-3 diamond package.

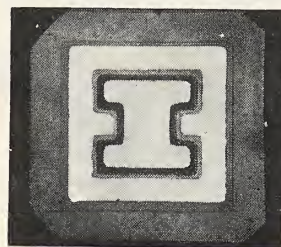
P&A: \$2.10-\$10.40 (1-99); stock.

Mfr: Texas Instruments Inc., Semiconductor-Components Div.

ON READER-SERVICE CARD CIRCLE 504

Silicon Transistors

Interdigitated "I" geometry



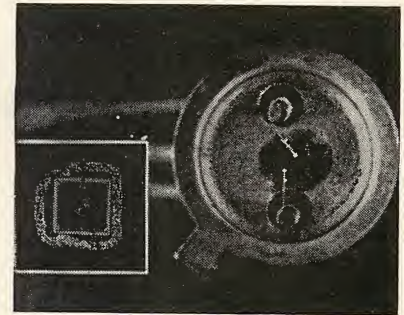
Collector breakdown voltages of 75 v min and typical total switching time of < 90 nsec are available in types 2N2787-2N2792. Noise levels as low as 0.5 db are offered in types 2N929 and 2N930, which are available singly, or as duals and matched duals.

Mfr: General Instruments Corp.

ON READER-SERVICE CARD CIRCLE 505

FETs

Planar-diffused silicon



P-channel UNIFETs have two different geometries with a 1.1 to 1 ratio of g_m to I_{DSS} and 6 v max pinch-off voltage. Storage temperature range is -65 to +200 C. Maximum gate-drain breakdown voltage of 20 v is guaranteed at $I_G = 1$ μ a.

Price: \$9.50-\$11.50 (over 100).

Mfr: Siliconix, Inc.

ON READER-SERVICE CARD CIRCLE 506

Silicon Transistor

Planar epitaxial

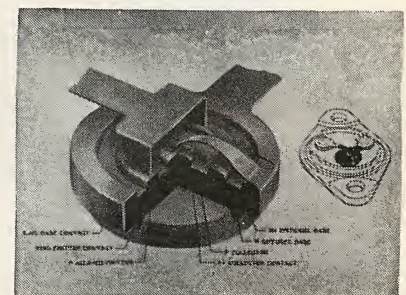
The 1.6 Gc type 2N2808 has an ac current gain of 5 at 200 Mc. It can be used as an rf amplifier to 500 Mc and as an oscillator to 1.6 Gc. Power gain is 20 db measured at 200 Mc; collector-to emitter voltage is 6 v, and collector current is 2 ma.

Mfr: Raytheon Co., Semiconductor Div.

ON READER-SERVICE CARD CIRCLE 507

Power Transistors

Breakdown voltage to 100 v



Fall time of types MP721A/B/C is 0.7 μ sec at 8 amps collector current for TV flyback circuits. The epitaxial-base germanium units have a saturation voltage of 0.3 v, max, at 10 amps.

Mfr: Motorola Semiconductor, Inc.

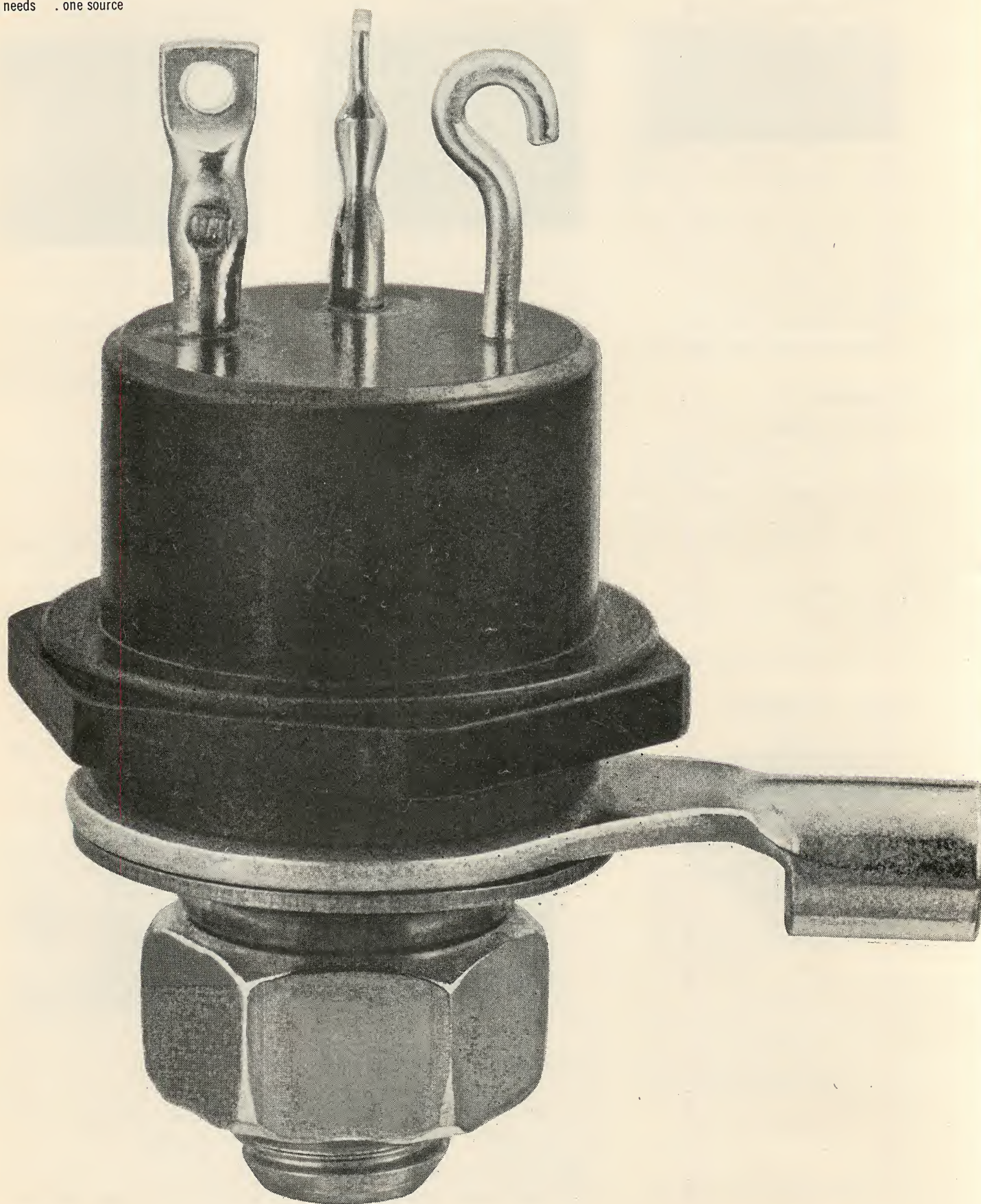
ON READER-SERVICE CARD CIRCLE 508

Electronic Components
from Westinghouse



For your needs . one source

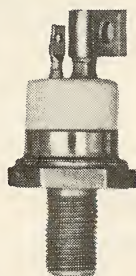
**THE NEW CASE
FOR RELIABILITY**



The industry's standard for silicon power transistors—now in a double ended case!

In response to customer demand, Westinghouse now makes available its field-proven silicon power transistor in a new double-ended case. Performance, reliability and construction features are the same as have been successfully used in Westinghouse military type transistors for the last three years. Over 5 megawatts of 30 ampere transistors are now serving in military and industrial applications.

The new double-ended transistor, 2N2757 series, comes in voltage ratings to 250 volts, current ratings to 30 amperes, and a variety of gain classes.



Rock top transistor for highest power ratings

The 250 watt, 300 volt 2N1809-2N2109 series in the rugged "rock top" case features the highest power dissipation ratings available in silicon transistors.



Conventional case for convenient mounting

The 2N2739-2N2754 series (formerly Type 109) offers the convenience of a low mounting profile. Dissipation ratings to 200 watts, currents to 20 amperes.

New procurement specifications

Procurement specifications on each of the above units are available in military format for designers and reliability engineers. These specifications outline electrical and environmental capabilities under standard Mil-spec conditions. Write for a free copy today on your company letterhead: Westinghouse Semiconductor Division, Youngwood, Pa. You can be sure... if it's Westinghouse. SC-1090

We never forget how much you rely on

Westinghouse

ON READER-SERVICE CARD CIRCLE 476

May 24, 1963

Power Transistors

Meet MIL-S-19500/102

Ratings of 150 w and 7.5 amp are available for these silicon devices. Type USN 2N1016Bm is rated at 100 v, and type USN 2N1016CM is rated at 150 v.

Guide: Insert bold-italic line

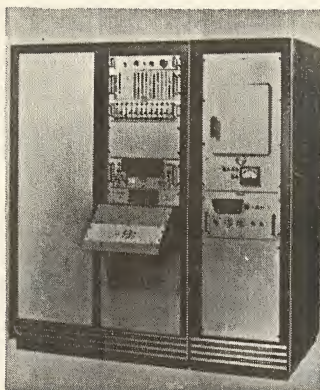
P&A: \$32.55-\$43.35 (100 or more).

Mfr: Westinghouse Electric Corp., Semiconductor Div..

ON READER-SERVICE CARD CIRCLE 509

Transistor Tester

Pulse testing



Test parameters up to 500 v and 25 amps are provided by the TACT unit. Pulse duration can be varied from 100-500 μ sec and 1-5 msec, and repetition rate from 2-100 pps. Test conditions are determined in a digital manner by prepunched cards.

Mfr: Texas Instruments Inc.

ON READER-SERVICE CARD CIRCLE 510

UHF Transistor

Low noise

Noise figure of the TA-2333 at 450 Mc is 4 db. Rf amplifier gain is 15 db, typical. Collector-to-base voltage is 30 v, min; collector-to-emitter, 20 v, min; total dissipation at 25 C free air, 200 mw.

P&A: \$35 (1-99); stock.

Mfr: Radio Corp. of America.

ON READER-SERVICE CARD CIRCLE 511

Power Transistors

Vhf units

Power outputs up to 5 w at 200 Mc are provided by the 70 and 140 v series 100. In the 200 series, model SN230 features power outputs of 5 w at 130 Mc, and model SN231 features 10 w at 130 Mc.

Price: \$95-\$145 (1-49).

Mfr: National Semiconductor Corp.

ON READER-SERVICE CARD CIRCLE 512

Silicon Transistors

90-nsec switching

Interdigitated "I" geometry is featured in these diffused-silicon devices. Types 2N2787-89 are available in the TO-5 case, and types 2N2790-92 are available in the TO-18 case. Collector breakdown voltages are specified at 75 v min; collector-to-emitter ratings exceed 35 v. Typical frequencies exceed 300 Mc.

Mfr: General Instruments Corp., Semiconductor Div.

ON READER-SERVICE CARD CIRCLE 513

Heat Sink

Printed-circuit board



Natural convection unit is said to provide the maximum ratio of heat dissipation to volume occupied. It is claimed that the model 2704 substantially increases transistor performance by optimizing the effect of heat transfer coefficient available in free convection. Both the TO-5 and TO-9 transistor cases can be accommodated.

Mfr: Astro Dynamics, Inc.

ON READER-SERVICE CARD CIRCLE 514

Switching Transistors

25-amp

Diffused alloy power types 2N2636-38 switch clamped inductive loads in microseconds at peak powers of 100, 1500 and 2000 w. Switching times range from 1-5 μ sec. Units can switch 25 amps at collector-emitter voltages of 40, 60 and 80 v.

P&A: \$26.25-\$38.25; stock.

Mfr: Bendix Corp., Semiconductor Div.

ON READER-SERVICE CARD CIRCLE 515

Silicon Transistors

Medium-power vhf

Power output is 3.2 w, min, at 125-Mc. Types 2N2781, 2N2782 and 2N2783 can be used as drivers to reactive multiplier chains to achieve up to 2-1/2 w power in the Kc range.

P&A: \$39.90-\$75; stock.

Mfr: TRW Electronics.

ON READER-SERVICE CARD CIRCLE 516

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does it all!

ALgonquin 4-9000

(BOSTON)



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- SILICON RECTIFIERS
- TRANSISTORS

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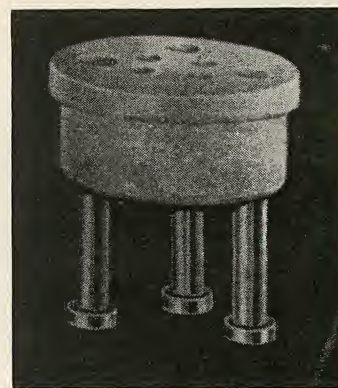
DeMambro

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ON READER-SERVICE CARD CIRCLE 477

Transistor Holder

Teflon insulated



The component is mounted on the shoulder of the Teflon bushing in model RTC-304T. It has a major diameter of 0.325 in. and a minor diameter of 0.290 in. Three through-hole lugs are provided on a 0.200 in. pitch circle for TO-5 type JETEC headers.

Mfr: Sealectro Corp.

ON READER-SERVICE CARD CIRCLE 517

Voltage Tester

3 μ sec current duration

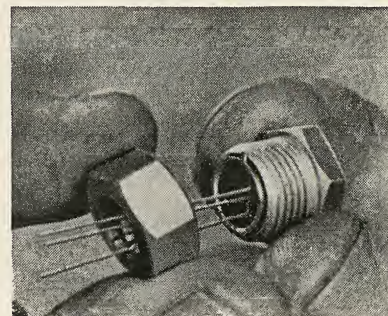
The time factor of the test, rather than the amount of current applied, is limited by model 1901A voltage breakdown tester. The duration of current avalanche through the test specimen is limited to 3 μ sec. Selector switches on the front panel determine the range (1 or 4 Kv) and the amount of ohmic current flow (10 μ a, 100 μ a or 1 ma).

Mfr: Microdot, Inc.

ON READER-SERVICE CARD CIRCLE 518

Transistor Heat Sink

TO-5 and TO-9 packages

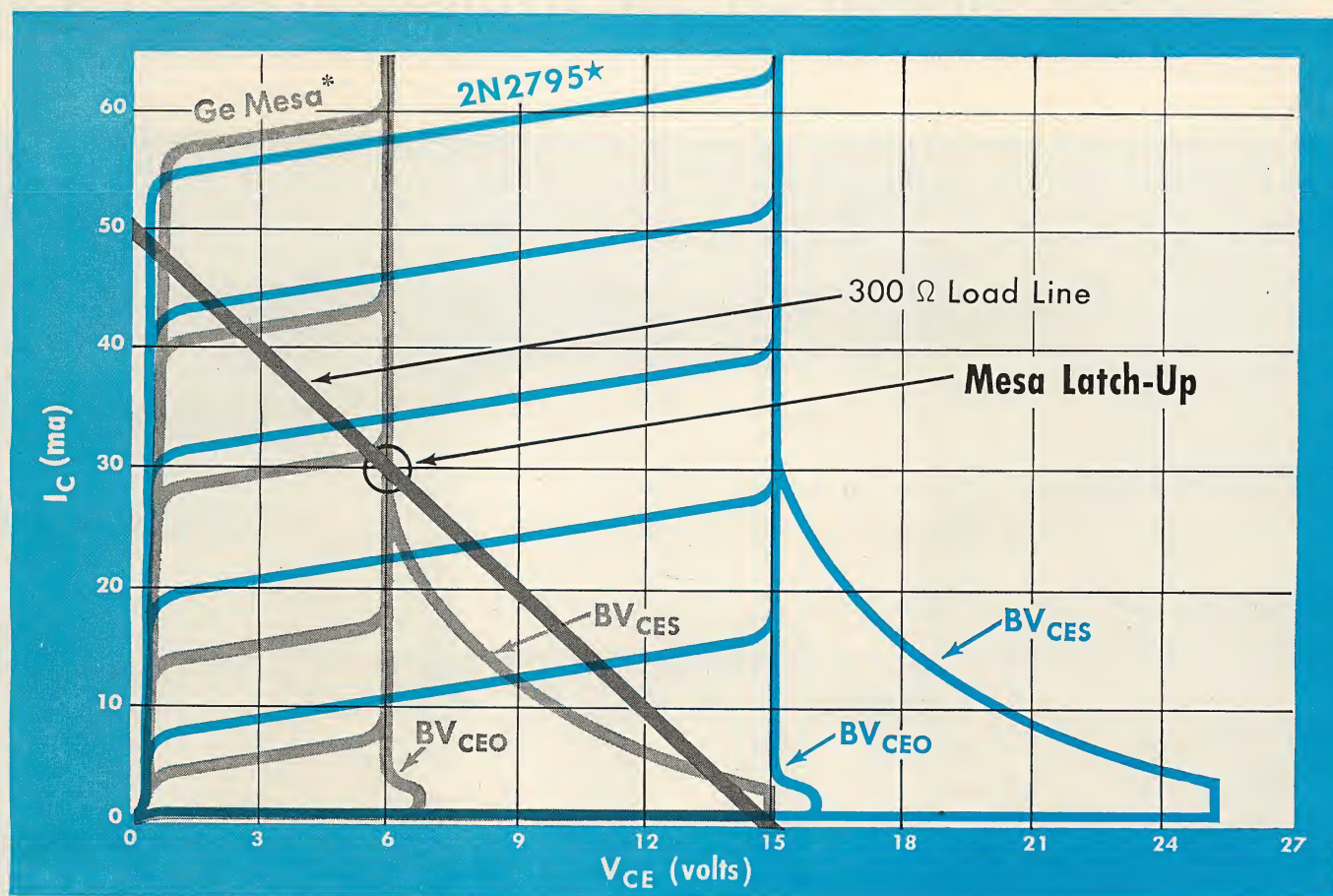


Conduction-cooled 1103 series is available in three finishes: uninsulated, electrically insulated and black anodized. Threaded two-piece construction tightens to grip both sides of transistor weld flange.

Mfr: Thermalloy Co.

ON READER-SERVICE CARD CIRCLE 519


SPRAGUE LOGIC TRANSISTORS GIVE SUPERIOR LATCH-UP PROTECTION!



*ratings for most prime germanium mesa types.

★based on guaranteed ratings!

For Guaranteed High Voltage Operation at High Speeds, Investigate Sprague ECDC[®] and MADT[®] Transistors

 TO-18 CASE	Type No.	f_T (typical)	BV_{CES} (minimum)	BV_{CEO} (minimum)
	2N2795	450 mc	25 volts	15 volts
	2N2796	450 mc	20 volts	12 volts
	2N984	350 mc	15 volts	10 volts
	2N979	150 mc	20 volts	15 volts
	2N980	150 mc	20 volts	12 volts
	2N2048†	250 mc	20 volts	15 volts

(†TO-9 Case)

● For additional information on Sprague High Voltage Logic Transistors, write to the Technical Literature Service, Sprague Electric Company, 347 Marshall Street, North Adams, Massachusetts.

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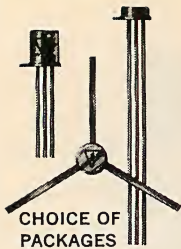


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May 24, 1963

ON READER-SERVICE CARD CIRCLE 478

T97

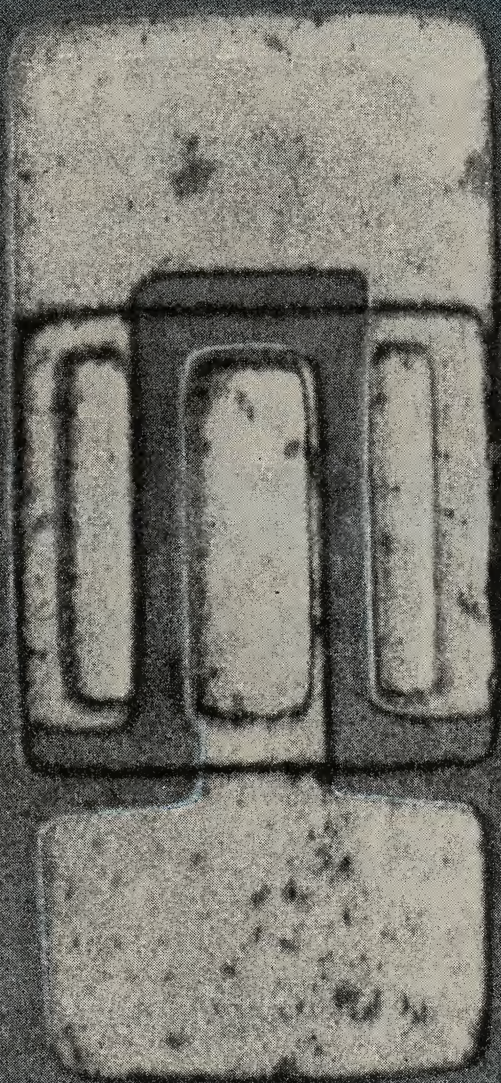


This is the micropower transistor—a new silicon epitaxial planar device that offers higher efficiency at microwatts or milliwatts. As a switch, or as an amplifier, the type 2N2784 offers capabilities beyond any now available! Typical: 1 KMC bandwidth—higher beta level at

microamperes, with reduced falloff beyond 10 milliamperes.

This performance stems from advanced device design and refined photolithographic techniques plus Sylvania's exclusive skills in epitaxial technology. Unusually small

Fastest silicon switch available: new 1 KMC



Epitaxial construction, new 3-stripe configuration, and small size, produce new high switching speed ($T_{on} + T_{off} = 12$ nanoseconds) with low saturation voltages (typically 0.2 volts).

junction sizes and spacings, low capacitances, result in improved frequency response for both switching and amplifier applications.

The Sylvania 2N2784 and the 2N709 and 2N709A, which are members of the 2N2784 family, are all avail-

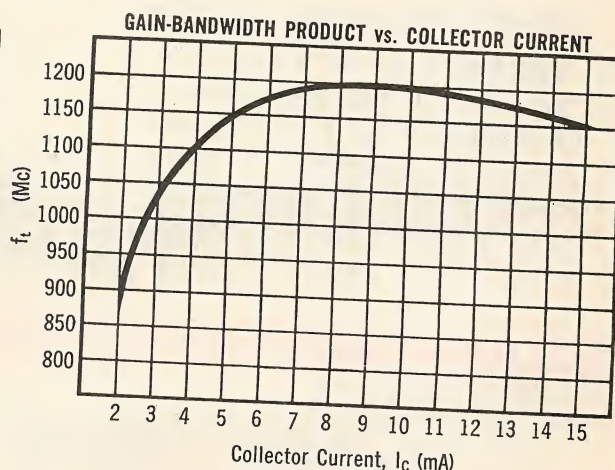
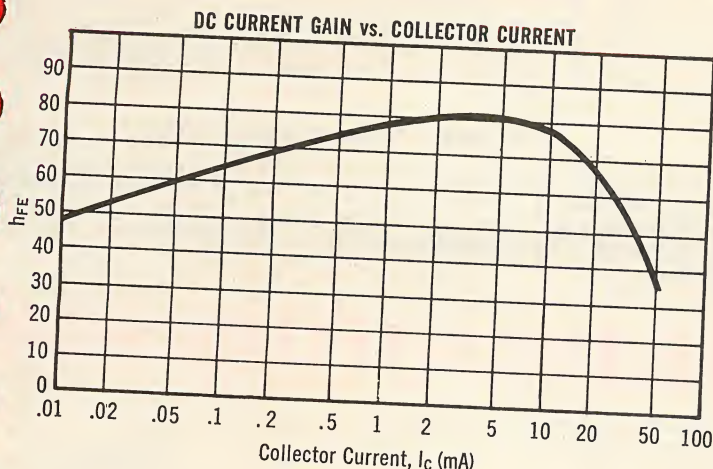
able in your choice of three packages—the TO-18, TO-46 "pancake," and the new TO-51 co-planar package.

For more information, see your Sylvania salesman or write to Semiconductor Division, Sylvania Electric Products Inc., Woburn, Mass.

Sylvania epitaxial planar transistor 2N2784

ON READER-SERVICE CARD CIRCLE 479

SYMBOL	CHARACTERISTICS	2N2784		2N709		2N709A		TEST CONDITIONS
		Min	Max	Min	Max	Min	Max	
h_{FE}	DC Current Gain	40	120	20	120	30	90	$I_C=10mA$ $V_{CE}=0.5V$
$h_{FE}(-55^\circ C)$	DC Current Gain	20		15		15		$I_C=30mA$ $V_{CE}=1.0V$
$V_{BE}(sat)$	Base Saturation Voltage	10		10		10		$I_C=10mA$ $V_{CE}=0.5V$
$V_{CE}(sat)$	Collector Saturation Voltage	.70	.85 V	.70	.85 V	.70	.85 V	$I_C=3.0mA$ $I_B=0.15mA$
C_{ob}	Output Capacitance		.26 V		.30 V		.30 V	$I_C=3.0mA$ $I_B=0.15mA$
C_{TE}	Emitter Transition Capacitance		3.0 pf		3.0 pf		3.0 pf	$I_E=0$ $V_{CB}=5.0V$
I_{CBO}	Collector Cutoff Current		2.0 pf		2.0 pf		2.0 pf	$I_C=0$ $V_{EB}=0.5V$
$I_{CBO}(150^\circ C)$	Collector Cutoff Current		5m μA		50m μA		5m μA	$I_E=0$ $V_{CB}=5.0V$
BV_{CBO}	Collector to Base Break-down Voltage		5.0 μA		5.0 μA		5.0 μA	$I_E=0$ $V_{CB}=5.0V$
$V_{CEO}(sust)$	Collector to Emitter Sustaining Voltage	15	V	15	V	15	V	$I_C=10\mu A$ $I_E=0$
BV_{EBO}	Emitter to Base Break-down Voltage	6.0	V	6.0	V	6.0	V	$I_C=10mA$ (pulsed) $I_B=0$
T_s	Charge Storage Time Constant	4.0	V	4.0	V	4.0	V	$I_C=0$ $I_E=10\mu A$
$t_d + t_r$	Turn-on Time ($V_{BE(10)}=-1.0V$)		5.0 ns		6.0 ns		6.0 ns	$I_C=I_{B1}=I_{B2}=5.0mA$
$t_s + t_f$	Turn-off Time		9 ns		15 ns		15 ns	$I_C=10mA$ $I_{B1}=2mA$
f_T	Gain-Bandwidth Product		9 ns		15 ns		15 ns	$I_C=10mA$ $I_{B1}=I_{B2}=1.0mA$
		1000	mc	600	mc	800	mc	$I_C=5.0mA$ $V_{CE}=4.0V$



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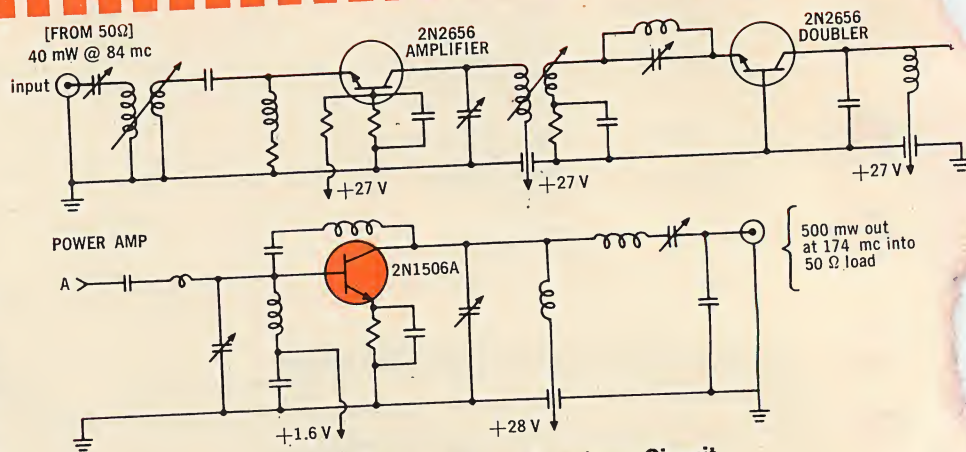
How to design transistorized communications equipment

**MEDIUM POWER
VHF TRANSISTORS**

2N1506A

• 1 watt • 70mc @ 28V • 10db gain

Ideal transistors for application in drivers and final amplifiers of telemetry transmitters to 2W, final amplifiers for mobile radio applications in the 140mc range, and as multipliers from 40 to 200mc.



1/2 Watt - 174mc Sonobuoy Circuit

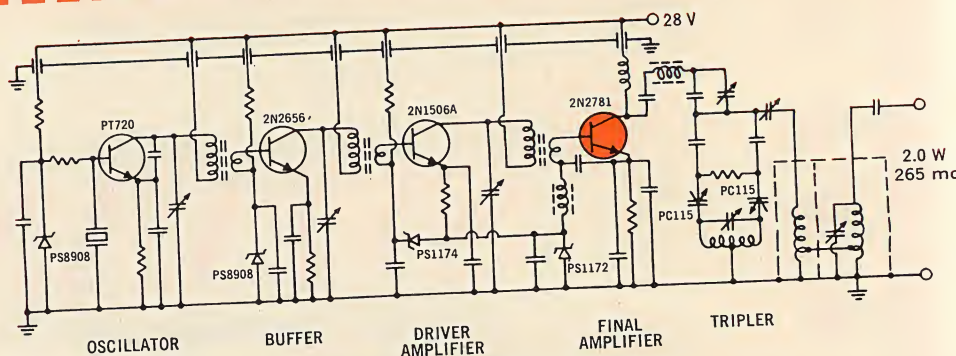
This circuit employs PSI 2N2656 and 2N1506A transistors to achieve high power for Sonobuoy applications. Outputs to 2 watts can be obtained by adding additional stages; the oscillator circuit is at the designer's discretion. This circuit is indicative of the increased design flexibility offered by PSI 2N2656 and 2N1506A silicon RF transistors.

**HIGH POWER
VHF TRANSISTORS**

2N2781

• 5 watts • 30mc @ 28V • 12db gain

Use this series as final amplifiers in communications equipment, 2 to 5W telemetry equipment and mobile radio designs.



2 Watt - 265mc Telemetry Circuit

Originally designed and engineered at PSI, this circuit applies a PSI PT720 as an oscillator, 2N2656 as a buffer, 2N1506A for the driver stage and a 2N2781 for the final, to deliver a conservative 2 watts at 265mc. This application is one of the first telemetry designs available using low cost, off-the-shelf units instead of state-of-the-art devices.

New PSI RF transistor application notes and bulletins:

- Summary of the State of the Art in the practical use of Communications Transistors
- Citizens Band Transmitter
- VHF Transistor Oscillator
- Radio Frequency Applications, Types PT900 and 2N1900
- 50W, 30mc Amplifier
- Class C—100 Watt—20 Megacycle Power Amplifier
- Class C—100 Watt—10 Megacycle Power Amplifier
- Class C—100 Watt—3 Megacycle Power Amplifier
- 1W, 1Kmc Transmitter
- 240mc PCM Transmitter
- 5W, 30mc Power Gain Test Circuit
- Inverter Design
- Switching Application, Types PT900, 2N1899, 2N1901
- Pulse Driver for Inductive Elements and Magnetic Memories, Types PT900, 2N1899, 2N1901
- 3W, 125mc Amplifier
- $\frac{1}{2}$ W Citizens Band Transmitter
- 100W, 100mc Amplifier
- 5W, 70mc Amplifier
- 10W, 100mc Oscillator

Free...

NEW RF TRANSISTOR APPLICATION LITERATURE

... Application ENGINEERING Assistance!

It is now possible to design all solid state communications equipment at costs comparable to, or below, vacuum designs . . . this new PSI application literature will help show you how! If you don't find literature listed on the back of this card covering your specific field of interest, contact your nearest PSI sales office and discuss your specific communications equipment design problem with one of our sales engineers. Let our experienced application engineering section show you the reliability, economy, equipment size reductions and ruggedness you can obtain when you **SPECIFY PSI** for all your RF transistor needs.

(If the postal return card has been removed from your copy of this publication, write on your company letterhead. The application literature listing has been repeated on the back of this card for your convenience.

PSI SERVES THE COMPLETE COMMUNICATIONS SPECTRUM . . . From low-level, low-noise oscillators and amplifiers to advanced high-power, high-frequency devices, PSI has the communications transistor your designs require.

For the past five years, PSI has dedicated the major part of its transistor development and engineering efforts towards optimizing capabilities of silicon transistors in all communications equipment. Today PSI is a leading producer of RF transistors for high reliability space communications equipment in such projects as Mariner, OAO, Ranger, Relay, and Explorer. Realizing that component cost is a major factor in communications equipment design, PSI has had, as an early objective, the pricing of high performance RF devices at levels which will hasten the era of all-transistorized communications systems in many new fields.

Call PSI today to discuss your particular communications equipment design problems. Let PSI application engineering show you how you can design transistorized communications equipment on a vacuum tube budget through lower overall component costs due to lower voltage operation, lack of heater equipment, smaller power supplies, and greater efficiencies.

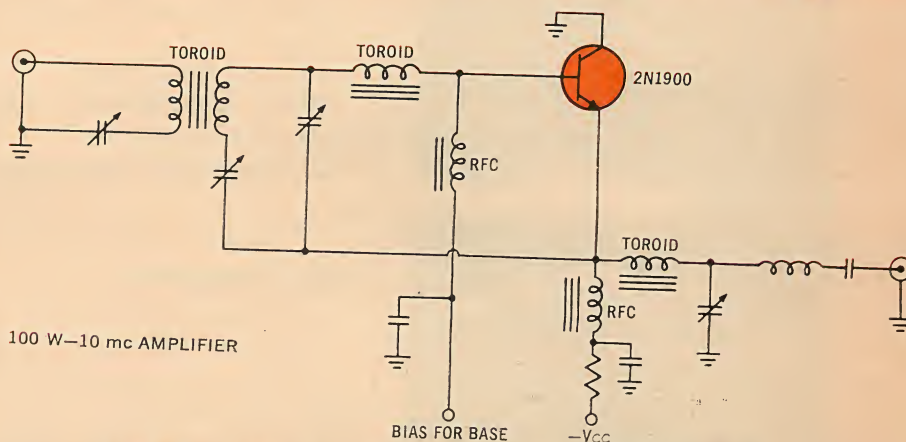
on a vacuum tube budget!

HIGH POWER HF TRANSISTORS

2N1900

- 100 watts • 10mc @ 60V
- 10db gain

The PSI 2N1900 series is ideal for commercial, marine, and military PRC and VRC designs from 2 to 12mc, as 10 amp switchers in power conversion applications, and amplifiers in VLF transmitters up to 5KW.



100 Watt—10mc Amplifier for PRC, VRC and Marine Radio

This economical design employs optimum heat sinking to provide a substantial reduction in size over 100 watt tube amplifiers. This design employs a PSI 2N1900 in a **reliable**, cold-welded package to deliver 100 watts out at 10mc with greater than 10db gain.

LOW POWER/LOW NOISE UHF TRANSISTORS

2N2656

- 50mW • 100mc @ 10V
- 10db gain

Apply these low noise figure units to your oscillator designs up to 50mW. These transistors also provide optimum performance in low to medium-level class A and B buffer amplifiers by delivering up to 200mW RF power with over 50% efficiency.



Pacific Semiconductors, Inc.

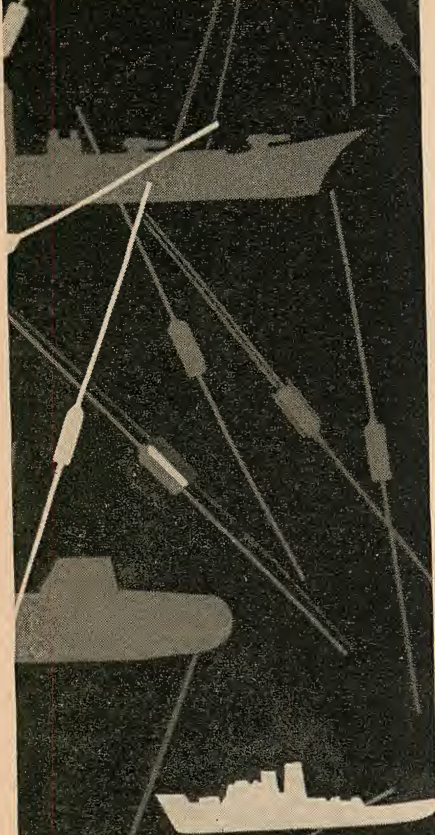
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a MIL-TYPE first from DICKSON



9 VOLT TC ZENERS to MIL-S-19500 / 156A(Navy)

Dickson is the first to offer 9 volt, 500 mw, silicon diffused-junction temperature compensated zener reference diodes to meet the requirements of MIL-S-19500/156A (Navy). USN Types 1N935B, 1N937B, 1N938B, and 1N939B offer temperature coefficients of .01, .002, .001, and .0005%°C. Modest quantities are immediately available for your critical military applications.

Dickson also offers the industry's broadest line of standard temperature compensated zener reference diodes. The following types are presently available from stock, to JEDEC specifications:

1N429	1N1530-30A	1N2765-70A
1N821-27A	1N1735-42A	1N3154-57A
1N935-39B	1N2163-71A	1N3580-84B
1N941-45B	1N2620-24B	1N4057-85A

For complete information contact your authorized Dickson Representative, or write, wire or phone Mr. Jack Nancarrow, Dickson Electronics, P. O. Box 1387, Scottsdale, Arizona. Phone code 602, 946-5357.



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ELECTRONICS CORPORATION

248 Wells Fargo Avenue, Scottsdale, Ariz.

ON READER-SERVICE CARD CIRCLE 481

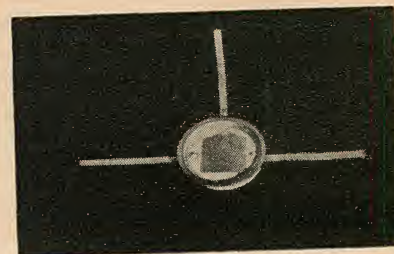
Transistor Package

Integral beryllia base

Packages of 5/8 in. and 3/4 in. diam, for devices in the 12-20 amp range, with two, three or four leads are included in this line. Glass-to-metal seals are said to be eliminated by the package, whose lower beryllia surface provides a direct path from the semiconductor material to a chassis or heat sink.

Mfr: National Beryllia Corp.

ON READER-SERVICE CARD CIRCLE 520



Silicon Transistors

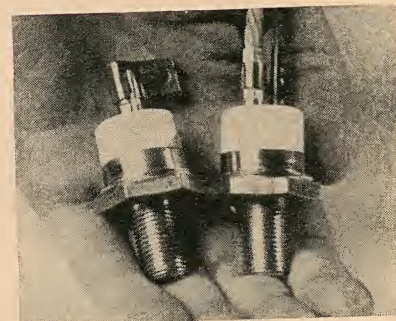
6000 w peak

NPN silicon power units have voltage ratings of 50-200 v. Typical saturation resistance of series 2N1830 and 2N2130 is 0.035 ohms. Minute gain is 10 at 25 amps collector current. Dissipation is 250 w; peak power capability is 6000 w. Operating temp range is -65 to +175 C.

Price: \$105-\$198 (100+).

Mfr: Westinghouse Electric Corp., Semiconductor Div.

ON READER-SERVICE CARD CIRCLE 521



Heat Dissipators

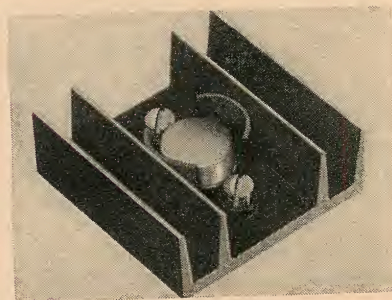
Horizontal or vertical

Designed for TO-8 or stud-mounted semiconductors, Series 9021 units dissipate heat at the rate of 6 C/w. They employ an extruded parallel fin design and may be used in either a vertical or horizontal position.

P&A: \$0.50-\$0.95; stock.

Mfr: Augat Inc.

ON READER-SERVICE CARD CIRCLE 522



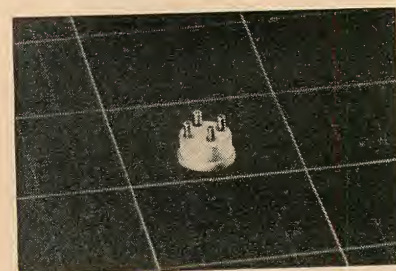
Transistor Holder

Teflon-insulated

Providing 4 connections on a 0.200-in. diam pitch circle, the RTC-400T-L2 features lugs extending 0.070 in. below the Teflon body for circuitry connections. The major diameter is 0.325 in. and the minor diameter is 0.290 in. Over-all socket height is 0.225 in. and unit may be used on chassis thicknesses up to 0.093 in.

Mfr: Sealelectro Corp.

ON READER-SERVICE CARD CIRCLE 523



Transistors

Power switching

Switching up to 1200 w in μ secs is afforded by these 10-amp, diffused alloy, power transistors. They feature a high cutoff frequency, $f_{ab} = 1.5$ Mc; and low saturation voltage, $V_{ces} = -0.5$ v dc, max at $I_c = 5$ amp, $I_B = -0.5$ amp. Series 2N2288-2290 are germanium pnp type units.

Mfr: Bendix Semiconductor.

ON READER-SERVICE CARD CIRCLE 524

Industrial Transistor

Mesa construction

Germanium epitaxial type TIX-316 has an h_{fe} of 35 min at 1 Kc, h_{fe} of 4.0 at 100 Mc; R_b/C_c is 15 psec, max; C_{ob} is 3.0 pf, max; and NF is 4.5 db max at 200 Mc.

The device is packaged in a four-lead TO-18 case.

P&A: \$2.93; 3 weeks.

Mfr: Texas Instruments Inc., Semiconductor-Components Div.

ON READER-SERVICE CARD CIRCLE 525

Transistors

Silicon unijunction

Useful in oscillators and timing circuits, types 2N2646 and 2N2647 feature maximum peak point emitter current of 25 μ a (inter-base voltage = 25 v) and maximum valley point current of 18 ma (inter-base voltage = 20 v, $R_{B2} = 100$ ohms) at 25 C.

Mfr: General Electric Semiconductor Products Dept.

ON READER-SERVICE CARD CIRCLE 526

Germanium Transistors

Diffused-alloy

PNP types 2N2285 through 2N2287 feature collector-emitter breakdown voltages of -30 to -80 v dc, min. Saturation voltage ($V_{CE(s)}$) is -0.65 v dc, max. Units are capable of switching up to 1600 w in 1-5 μ sec.

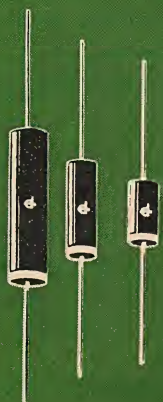
Mfr: Bendix Corp., Semiconductor Div.

ON READER-SERVICE CARD CIRCLE 527

NEW 1N4057-85A TC ZENERS FOR HIGH VOLTAGE APPLICATIONS

12.4 to 200 volt
temperature
compensated zeners
immediately available from

DICKSON



TYPES 1N4057
THRU 1N4085A

Zener Voltages:
12.4 to 200 v

Temperature
Coefficients:
.005%/°C standard
.002%/°C standard
.001%/°C to order

Voltage Tolerances:
5% standard
1% to order

Temperature Range:
-55 to +100°C

Dickson also supplies
1N1785-42A and
1N2765-70A series for
existing designs.

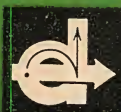
This Dickson TC zener series, the broadest ever developed for high voltage circuits, represents an ideal combination of performance, size, stability, and reliability. The rugged DURAPAK® high temperature, vacuum-molded package, exclusive with Dickson, provides a hermetic seal of the highest quality. Units meet or exceed environmental requirements of MIL-S-19500 and have passed 1000 hour storage life-tests at temperatures of 150°C.

Economical, too! Lower voltage units cost about 40% less than conventional devices. Higher voltage units offer substantial savings over small devices used "in series".

They are available from your nearby Dickson distributor. Call him, today, for immediate delivery.

FOR COMPLETE TECHNICAL INFORMATION, write: Mr. Frank Malley, Dickson Electronics, P.O. Box 1387, Scottsdale, Arizona.

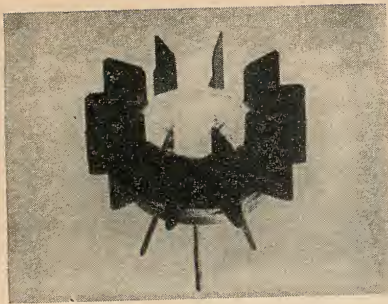
*trademark of Dickson Electronics Corp.



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ELECTRONICS CORPORATION

248 Wells Fargo Avenue, Scottsdale, Ariz.

ON READER-SERVICE CARD CIRCLE 482



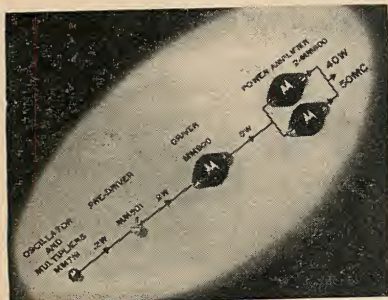
Transistor Heat Sink

Beryllium copper

For use with the TO-8 transistor, models 211, 213 and 215 feature a featherweight cooler which is said to provide rigid contact of large areas. Special tapered installation tools are available.

Mfr: Wakefield Engineering, Inc.

ON READER-SERVICE CARD CIRCLE 528



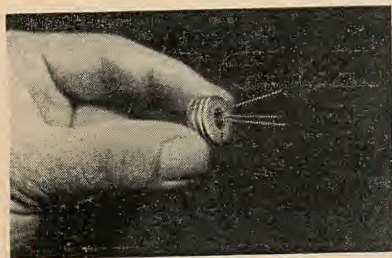
Silicon Transistors

High-power vhf

Two 50-Mc power devices, types MM800 and MM799, have a guaranteed power gain of 7 db at 15 w output. Model MM801 is a medium power amplifier/driver with a power gain of 10 db for a 3.5 w power output at 50 Mc.

Mfr: Motorola Semiconductor Products, Inc.

ON READER-SERVICE CARD CIRCLE 529



Transistor Heat Sink

Convection cooled

Model 2211 dissipates approx 1 w at 150 C. It fits all TO-5 and TO-9 cases, regardless of case diameter. Dimensions are 5/8 in. in diameter by 5/16 in. high; total weight is 0.056 oz.

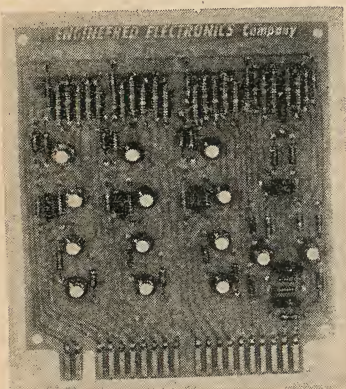
Price: \$0.18 ea (+100), \$0.10 ea (+1000).

Mfr: Thermalloy Co.

ON READER-SERVICE CARD CIRCLE 530

Digital Modules

Operate to 120 C



Nine basic circuit cards are offered in 1 and 10 Mc versions. Power required is ± 12 v dc. Logic levels are 0 and 6 v dc. Card dimensions are 4-1/4 x 5 x 1/16 in.

Mfr: Engineered Electronics.

ON READER-SERVICE CARD CIRCLE 531

Planar Transistors

15-pf collector capacitance

A minimum current transfer ratio of up to 3 is available with types 2N910-912 and 2N1973-74. The series is designed for use in high frequency amplifier circuits.

Mfr: General Electric Semiconductor Products Dept.

ON READER-SERVICE CARD CIRCLE 532

Silicon Transistors

Npn planar

Minimum current transfer ratio of types 2N1189 and 2N1890 is up to 3.0 at 25 C. Units are designed for high frequency amplifier and oscillator circuits.

Mfr: General Electric Semiconductor Products Dept.

ON READER-SERVICE CARD CIRCLE 533

Transistors

Planar passivated

TO-5 size differential amplifiers, types 2N2480/80A offer maximum voltage differentials of 5-10 mv. At 25 C, the collector-to-emitter voltage is 5 v and the collector currents are 100 μ a and 1 ma.

Mfr: General Electric Semiconductor Products Dept.

ON READER-SERVICE CARD CIRCLE 534

Chopper Transistors

Double-emitter types

Breakdown voltage of types 3N74 through 3N79 is $BV_{E1E2} \pm 18$ v min at $I_E \pm 10 \mu$ a). Emitter currents are as low as 2 na at ± 15 v and offset voltages are $\pm 50 \mu$ v for specified conditions with temperatures from -25 to +100 C.

Mfr: Texas Instruments Inc., Semiconductor-Components Div.

ON READER-SERVICE CARD CIRCLE 535

Kovar Tab Transistor

Npn silicon planar

Maximum collector leakage current for types 11B554-556 is 25 μ a at 25 C. Units are silicon planar versions of TO-5 types 2N1613, 2N1711 and 2N1893.

Mfr: General Electric Semiconductor Products Dept.

ON READER-SERVICE CARD CIRCLE 536

Silicon Transistor

High frequency

Interdigitated epitaxial planar device, type 2N2865, has a neutralized power gain of 18 db; oscillator output is 55 Mw at 500 Mc. Specifications include an NF of 4.5 db max at 200 Mc and an R_p' , C_c of 15 psec max.

Mfr: Texas Instruments Inc., Semiconductor-Components Div.

ON READER-SERVICE CARD CIRCLE 537

Chopper Transistors

Five-terminal devices

Planar epitaxial passivated types 2N2356/56A feature a collector leakage and emitter leakage current of 10 μ a, max. At 25 C, either collector-to-base voltage is 25 v.

Mfr: General Electric Semiconductor Products Dept.

ON READER-SERVICE CARD CIRCLE 538

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Reprints Available

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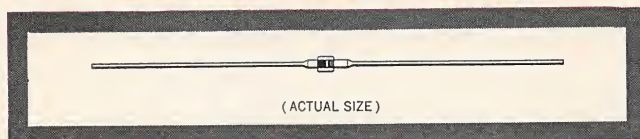
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NEW YORK 22, NEW YORK

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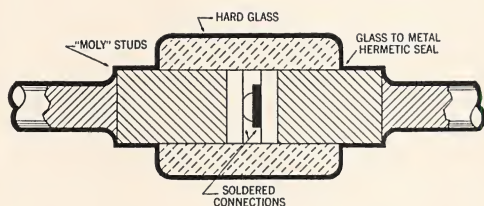
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DIODE

WITH PLANAR* RELIABILITY

- **SMALL**—sandwich construction—no whisker.
- **STRONG**—true hermetic seal. No pressure contacts.
- **MECHANICAL STRENGTH**—stud-to-cathode and stud-to-anode solder-down.
- **VERSATILE**—replacement type for any of 276 silicon diodes.



FDA 101

BV	75 Volts	Min.	@ $I_R = 5.0 \mu A$
I_R	$0.1 \mu A$	Max.	@ $V_R = 50 V$
V_F	1.0 V	Max.	@ $I_F = 20 mA$
t_{rr}	$2.0 m \mu sec$	Max.	@ $I_F = 10 mA, V_R = 6.0 mA$
C	$3.0 pf$	Max.	@ $V_R = 0V$

Available directly from distributor stocks.

Data sheet sent on request.

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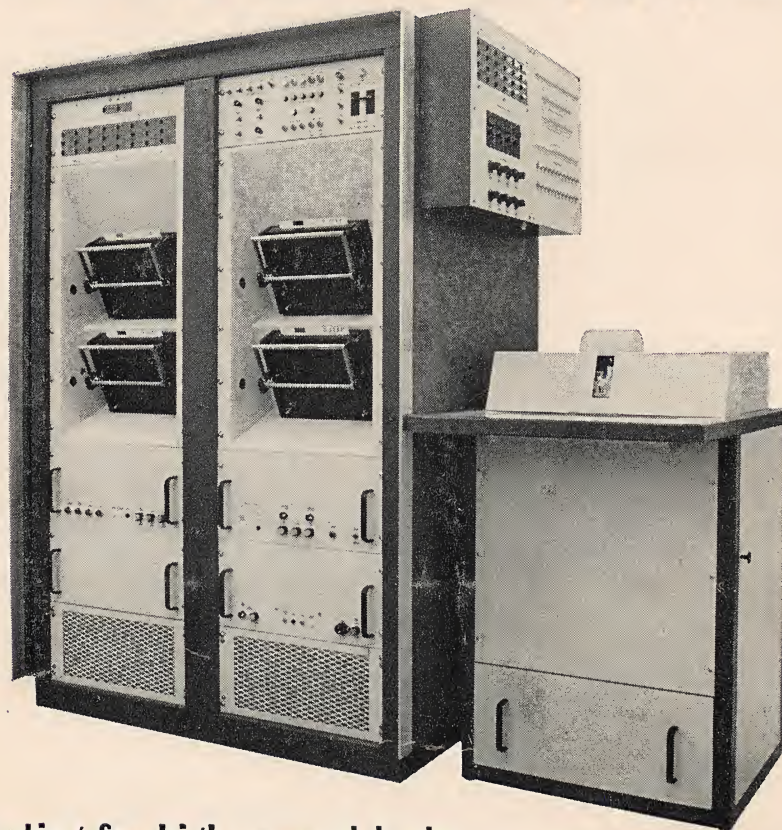
SEMICONDUCTOR

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ON READER-SERVICE CARD CIRCLE 483

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AUTOMATIC TRANSISTOR TESTER/SORTER



FAIRCHILD
SERIES
200

- **Pulse testing for high current tests**
- **Completely programmed with four plastic punched cards**
- **Tests 1500 transistors per hour — 24 tests per device**
- **Tests may be programmed in any order**

The high-speed, automatic classification and sorting capabilities of the Series 200 give this tester a wide variety of applications for both users and producers of transistors. It performs any combination of 24 standard tests—or a single test up to 24 times—on a go/no-go basis. The tests may be programmed in any order through an easy-to-use punch card system. Test rate: 1500 transistors per hour!

Pulse testing techniques eliminate junction heating effects to ensure accurate high current tests. Each tested transistor is automatically placed in the appropriate sort bin. The

Series 200 also features automatic detection of incorrect programming and performs an equipment self-check test during each test sequence. Write for data sheet and free demonstration. Fairchild offers the widest selection of equipment in the industry.

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